JUNE 1940 EIGHTH ANNUAL CONVENTION-IN-PRINT 50c a copy

ELECTRICAL WEST

THE ALL-INDUSTRY MAGAZINE OF PROGRESS

Boosting summer profits with Electric Roasters

Edison advertising boosts summer appliance sales by promoting fast moving, profitable-to-handle electric roasters. Extensive electric roaster promotion via billboards, car cards, direct mail and local newspapers gives powerful sales support to every appliance dealer in Edison territory.

Cooks everything... from soup to meat
ELECTRIC ROASTER
Event
NOW AS LOW AS $3 DOWN
ROASTS
BAKES
BROILS
FRIES
NOW... ENJOY COOLER, EASIER, BETTER COOKING
Treat yourself to cool, fast, economical electric cooking with a modern electric roaster. It bakes, roasts, broils, fries—cooks anyplace there is an electrical outlet. It occupies only two feet of space—costs no more to operate than your electric iron. Low prices and convenient terms make it easy to own a modern electric roaster. See them today.
★★ NEW 1940 ELECTRIC ROASTERS ... available in either table or detachable cabinet models with many new features:
• Automatic heat control
• Improved griddle and broiler units
• Beautiful modern cabinets with toe-space at bottom
• All models portable
• Time control clocks available
Edison
AT YOUR DEALER OR EDISON OFFICE

SOUTHERN CALIFORNIA Edison

ELECTRICAL WEST (with which is consolidated The Journal of Electricity), June, 1940. Vol. 84, No. 6. Published monthly by the McGraw-Hill Company of California, 68 Post Street, San Francisco, Calif. Entered as second class matter at the post office at San Francisco under the Act of March 3, 1879. Additional entry as second class matter at the post office at Los Angeles. Printed in U. S. A. Subscription rate in U. S. and U. S. possessions, and Canada, $2 per year; all other countries $3 gold (thirteen shillings). Single copy 25c.
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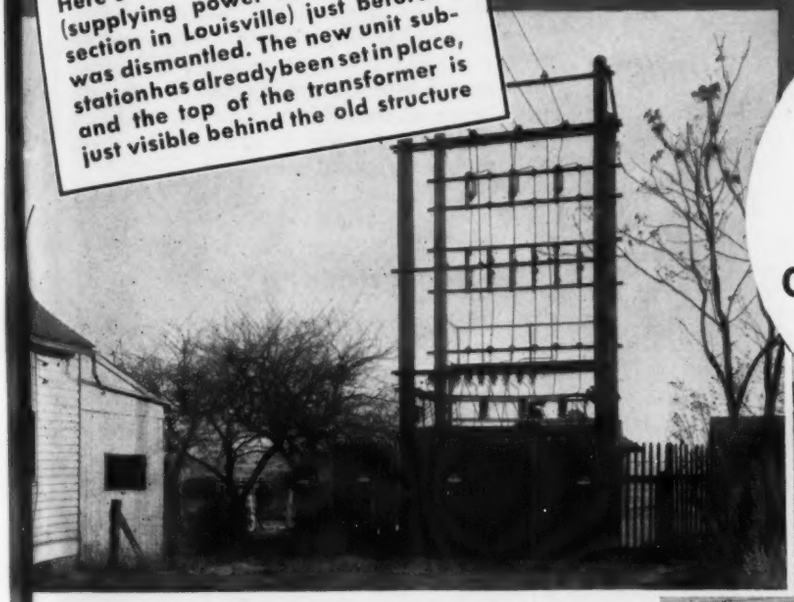
What an Improvement!

When Modern Unit Substations Replace the Old, Conventional Structures

BEFORE

Here's the old outdoor substation (supplying power to a suburban section in Louisville) just before it was dismantled. The new unit substation has already been set in place, and the top of the transformer is just visible behind the old structure



Watch a G-E Unit Substation Improve Appearance, Cut Space Requirements, Increase Capacity

AFTER

Now the old station has been removed, and the G-E unit substation — neat, compact, attractive — has taken over the job. Rating of the new station is 2000 kva, which is twice the capacity of the old station. (The brick house in the rear is not part of the electric substation)

THE trend is to modern, factory-assembled unit substations—for economy, flexibility, and attractive appearance. The Louisville Gas & Electric Company, for example, has a policy of replacing existing conventional substations with unit substations whenever load growth makes it necessary to increase substation capacity in residential or suburban areas.

And no wonder! With unit substations, expensive new construction is avoided. Their compact design makes possible the installation of additional capacity without an increase in the real-estate investment. The greatly superior appearance of the new stations builds customer good will. If future system growth makes it desirable to relocate the substation, it can be moved readily to a new location.

Find out for yourself how G-E unit substations can simplify system planning and cut costs for you. Write today for our new brochure GEA-2996, which contains the complete story. In addition to both single-circuit and multiple-circuit unit substations for permanent installation, it describes the new G-E portable unit substations for temporary installation or for emergency use. Address General Electric, Schenectady, N. Y.

GENERAL ELECTRIC

401-1

BETWEEN THIS MONTH'S COVERS

We the People

THE INDIVIDUAL IN OUR INDUSTRY (p. 48) PCEA president W. W. Glosser is doubtful about the individual in the electrical industry. Is the individual aware of the responsibilities that are his to handle? he asks. Glosser concentrates his address on the most basic responsibility in the industry and tells how to take care of it. Strong words by Wendel Willkie are quoted to emphasize the multitude of other responsibilities electrical men must face for the good of their life's work.

TNT

TIME FOR A DOUBLE-BARRELED OFFENSIVE (p. 50) President of the Northwest Electric Light & Power Assn., J. E. E. Royer of the Washington Water Power Co. adds two important activities to the agenda. Beyond extending an improving service, lowering rates, Royer would have the industry secure for itself greater public enthusiasm, and solve the problem of what to do with the kilowatts of federally constructed projects. He feels that the utility story can be retold time and time again, and that the light of public relations can be turned on every action and policy.

Mouthpiece

BONNEVILLE SPEAKS TO PORTLAND (p. 52) Paul J. Raver, Bonneville administrator, spoke his piece at Reed College several weeks before the Portland PUD election. His words were an attack on the local private utility, and was an attempt to influence votes in favor of the PUD proposal. Holding companies were particularly attacked. Raver also claimed that private utilities were obstructing Bonneville's progress in the Northwest. and declared they openly opposed the establishment of publicly-owned systems.

Rebuttal

THE IMPORTANCE OF PRIVATE ENTERPRISE (p. 53). In answer to Bonneville's representative at Reed College in May, Paul B. McKee, president, Pacific Power & Light Co. expressed the opinion and feelings of many a utility man in the West. And he has a lot of new ideas and suggestions to offer as he traces his career in the electric industry through 27 years of service. McKee cites the position held by the industry through years of depression, explains present years of regulation and looks far into the future to see private enterprise as the safeguard of American freedom.

One Year's Work

NORTHWEST ASSOCIATION (p. 71): The Association of electrical men in the Northwest is organized in three sections —engineering, commercial and accounting. Each year, these three sections meet separately. Each of the first two presents its year's work in the form of 30 or 40 papers, dealing with specific, current problems in its field. ELECTRICAL WEST carried news stories covering the commercial meeting in the April issue, the engineering meeting in the May issue. The accounting section met the end of May, will be covered in July. The papers themselves, and the discussions which they evoked, appear in this issue and are indexed on p. 71. In the case of the engineering papers, a few of special interest have already been published or are to be published in July or August. These publication pages beginning on p. 71 constitute a complete record of the Association's proceedings for the year.

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Cover: Created for ELECTRICAL WEST by Bill Saunders, San Francisco photographer.

Inaugural

FIRST IES CONFERENCE BLAZES A NEW TRAIL (p. 146). The first regional conference of the Illuminating Engineering Society set new standards in the presentation of a compact, well-timed program. Over 400 electrical men were on hand in Los Angeles to greet IES president Lester Graves. Frank Hansen, director of the Western Institute of Light & Vision, served as general chairman and did a grand job.

Idea Factory

PCEA CONVENTION (p. 148). Smooth as silk and slick as glass, and as full of meat as a turkey drumstick was the PCEA convention held in Oakland this year May 22-24. The hotel rooms bulged with ideas, and the general halls were packed with electrical men out to hear about their industry. Beginning with president Glosser's address along to the general banquet and dance on the closing night, the convention revealed both the progress and the future of the industry under a full spotlight. When the last paper was tucked in the briefcase, when the last cigar was smoked and farewells made, delegates knew they had been to a real session, and they already looked forward to the new ideas and the general spirit and good fellowship of the next.

Five-Star Final

NEWS OF THE INDUSTRY (p. 174) Ickes gives City of San Francisco breathing spell on Hetch Hetchy decision . . . Quake in Imperial Valley does little damage to utilities in the area . . . Portland citizens say "No" to public power . . . Federal Court sets valuation on Puget Sound property in Whatcom County . . . California contractors hearing set for June 10 . . . Small operator fights "invasion" of Rea in Colorado . . . Parker Dam Hydro plant construction goes forward . . . Tillamook County (Ore.) signs Bonneville contract . . . Washington Water Power declares rate reductions . . . Washington PUD balks at acquisition of condemned property . . . Grand Coulee contracts ordered by Ickes . . . Tracy named new asst. manager of Sierra Pacific . . . Frank Kerr dies in Minnesota . . .

What's a Week in the Life of a Power Cable?

IT takes years, not weeks, to measure the life expectancy of an electric cable. No laboratory test has yet been devised that reproduces the conditions encountered in service.

That's why we base all cable recommendations on actual performance, never on empirical short-term tests. When our engineers recommend a rubber insulating compound, it's because that compound has given remarkably good service in similar applications.

For Example: Back in 1909, American Steel & Wire Company made the first non-leaded submarine cable, insulated with a special water-resistant compound since called Amarine. That cable, after conducting power at 25 KV across the St. Lawrence River for 31 years, when inspected recently, was found to be "still in excellent condition, good for many more years of service."

That's 31 years of immersion in water and mud, of direct burial of shore ends in acid and alkaline soils, and of exposure of pole risers to extremes of heat and cold—the same conditions, in exaggerated degree, that are found in many less exacting applications.

Here is real proof that American Steel & Wire Company knows how to engineer and manufacture cables for long, trouble-free service.

These rubber insulating compounds offer long, trouble-free service

AMERITE—a 30% Class AO compound for general underground or aerial service.

AMARINE—a 40% rubber compound recommended especially for non-leaded submarine service.

AMPEROX—a heat-resistant compound of the superaging type for operation at temperatures up to 75°C.

AMERCLAD—a jacket compound which offers unsurpassed resistance to abrasion and mechanical abuse.

COLUMBIA STEEL COMPANY, *San Francisco, Pacific Coast Distributors of Electrical Cords & Cables*

Manufactured by

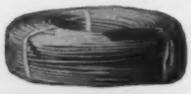
AMERICAN STEEL & WIRE COMPANY, *Cleveland, Chicago and New York*

United States Steel Export Company, New York

UNITED STATES STEEL

The Austin Line

Austin Wires and Cables for Every Purpose

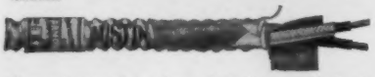


Austin Electrical Metallic Tubing hot dipped galvanized and lacquered inside and out.

American Rigid Conduit hot dipped galvanized and lacquered inside and out.

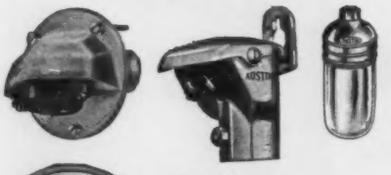
American Black Enameled Rigid Conduit.

Austin Double Bushed and Bonded Armored Cable.

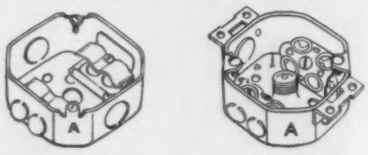


A most complete line of Fittings and Tools for Electrical Metallic Tubing.

REA FITTINGS



BOXES AND COVERS



SEND FOR COMPLETE CATALOG

THE M. B. AUSTIN COMPANY

CHICAGO, ILL.

Pacific Coast Representatives and Warehouse Stocks

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823 E. Third Street
Los Angeles, California

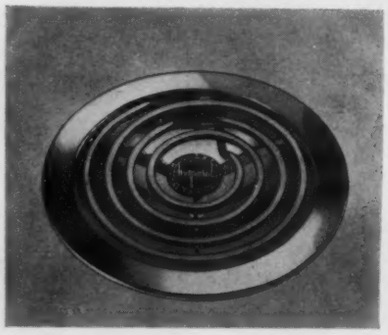
NICHOLAS AND COOK
1063 Howard Street
San Francisco, California

W. W. WHEAT AND SON
1000 Lenora Street
Seattle, Washington

NEW PRODUCTS

Replacement Unit (601)

A new line of 1940 Calrod replacement units, which may be used to modernize surface cooking equipment on old electric ranges of practically any make, has been introduced by the Product Service division of Hotpoint. Exclusive features which make possible the fine service record of Calrod electric heating



units, are all present in the new replacement units. They are available in two types—"Hi-Low, and "Equal Wattage," both of which are three heat. Both are made of corrosion-resisting materials throughout.

Contactors (602)

A new line of improved heavy-duty d.c. magnetic contactors, designated as "Series 200" Type SM, is announced by Westinghouse. The armature overtravel of the contactor is increased, contact tips are larger, and nitrided bearings employed. The wearing depth of the contacts on all magnet closed contactors is increased approximately one-third by extending the armature overtravel, thus prolonging the life of the tips. Heat is more efficiently conducted away from the contact surface by the enlarged mass of copper.

Overcurrent Relay (603)

A new single-phase directional overcurrent relay using an induction-cylinder instead of a disk for the directional element is introduced by General Electric. This unit is similar to the cup-type unit that has been widely used for several years in various applications such as network relays, polyphase directional relays, slip-cycle impedance relay, and the carrier-current relay. The element employs the "billiard-ball" contact construction. With the use of a direct-acting arm, this construction suppresses contact bounce. Contacts are mounted for easy inspection.

Kitchen Fan (604)

A new development in kitchen ventilation, the remote control Kitchen Fan, has been introduced by The Autovent Fan & Blower Co. Unusual convenience of operation make possible installation in any desired location. This unit comes in one standard size and is constructed with an adjustable wall sleeve, making it adaptable to any wall thickness. Motors are quiet operating and built for years of service.

FRICTION and RUBBER TAPES

GREATER STRENGTH

NON-FRAY EDGES

CORRECT ADHESION

Send for samples

Northwestern Agencies
2411 First Ave.
Seattle

Nicholas & Cook
1063 Howard Street
San Francisco

Consolidated Sales Corp.
742 Merchant St.,
Los Angeles

Over 50 years making Quality Tapes

CLIFTON MFG. CO., INC.
Mattapan Boston, Mass.

IDEAL BX ARMOR CUTTER

New

Strips in one operation! Easy and convenient to use. No more bending of cable, fussing, shorts or wasted BX. Jaws are formed to take two or three wire, No. 12 or No. 14 cable. Handy pocket size. Inexpensive.

New IDEAL

"Snap-Tite" Switchbox Supports

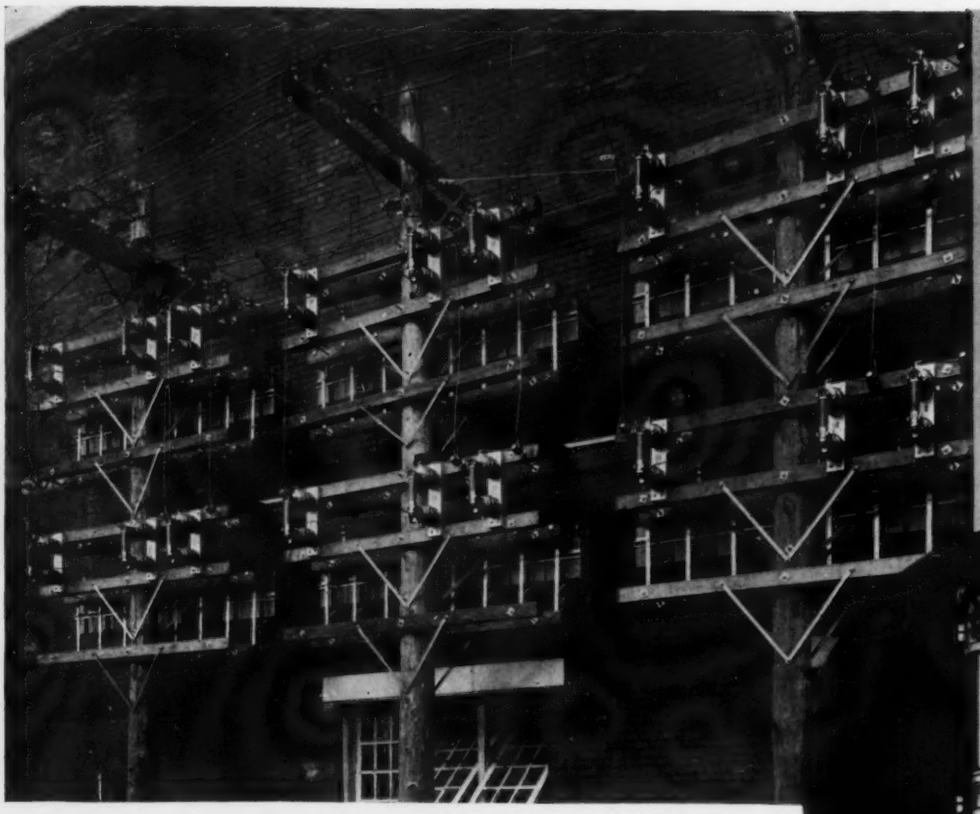
Securely hold any standard sectional switch box in composition walls--Celotex, Plaster Board, etc. No screws or special tools required. Fastenings are all outside of box. Easy to install, inexpensive!

Other Money Makers

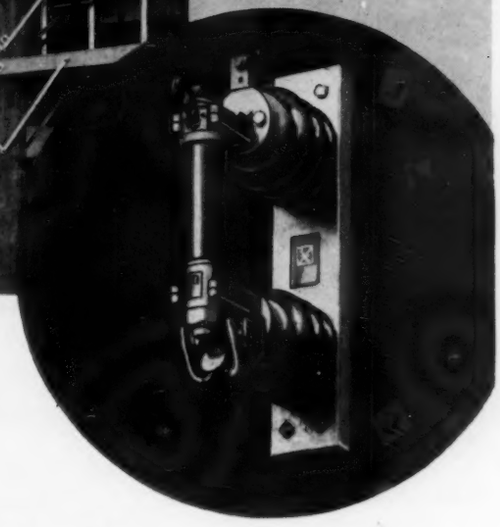
"Wire-Nuts"
"E-Z-" Wire Strippers
Cable Ripper and Wire Gauge
Joist Boring Machine
Fuse Clip Clamps
Fish Tape, Reel & Puller
Test-Lite and Fuse Puller
Fuse Reducers
Fuse Pullers

IDEAL SOLD THROUGH JOBBERS

Electrical Products Division
IDEAL COMMUTATOR DRESSER COMPANY
1042 PARK AVENUE SYCAMORE, ILLINOIS



Installation of S & C Type SM Heavy Duty Fuses (disconnect type) —7500 V, 200 Amp. max.—protecting capacitor banks on outgoing 2300 V three phase feeders. Easy to handle with ordinary switch stick.



When Installing Capacitors Protect Your System with

S&C Type SM FUSES

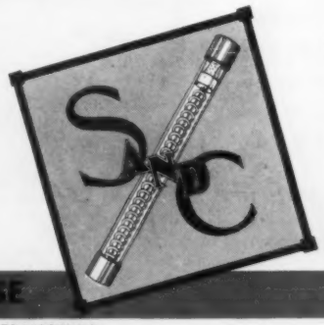
● High interrupting capacity, ease of handling fuse holder, and ease of installing Re-fill Units in the field, accurate calibration of fuse element, are some of the features that have made the S & C Type SM Fuse the outstanding choice where heavy short circuits may occur.

In the case of the capacitor bank installation shown above, the proximity to the generating station made necessary the most reliable system protection available.

S & C Type SM Fuses meet these requirements; they are made in ratings to 400 amperes and to 34,500 volts—and are relatively low in initial and maintenance costs. Wherever you require fuses of high interrupting capacity—"experience will choose the 'S M' Fuse."

"Replaceable-in-the-field" Fuse Unit—for Type SM Fuses.

SCHWEITZER & CONRAD, INC.
4435 Ravenswood Ave., Chicago, Ill.

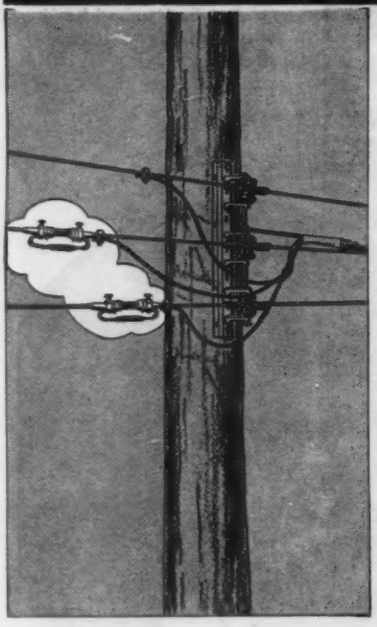


TYPE SM FUSES

EXPERIENCE WILL CHOOSE THE S&C FUSE

WESTERN REPRESENTATIVES:
SAN FRANCISCO — George E. Honn, 420 Market Street
LOS ANGELES — Farnham & Cunningham, Edison Bldg.
SEATTLE — T. S. Wood, 220 Ninth Avenue, North
SALT LAKE CITY — Riter Engineering Co., Kearns Bldg.

modernize
YOUR
DISTRIBUTION
PRACTICE—



Banked Secondary

RELIABLE INSULATED
STRAIGHT LINE
SPLICE

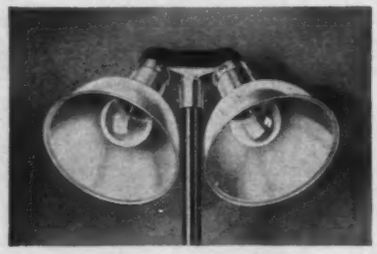
Reliable Insulated Straight-line Splices, with neatly fitting fuse clips, simplify secondary banking. A full range of sizes are available.

Inserted in the line without deadening or cutting in additional wire. Installed on secondaries without removing wires from structure. These splices make a neat and dependable job.

Reliable
ELECTRIC COMPANY
OVER 25 YEARS SERVICE TO THE UTILITIES

Playlite (605)

A new Duplex Playlite with two reflectors and wired sockets has been introduced by the S & M Lamp Co. Designed for 200 or 300-watt clear lamps, this unit is easy to install. There are no parts, fittings or gadgets to buy.



Cover can be removed for easy connection to exposed pigtails by loosening two wing nuts on top of cast aluminum head. This lamp is ideal for sports and commercial lighting.

Relay (606)

Relay No. 25, developed by the Kurman Electric Co.. meets the majority of specifications offered by those who require high R. F. insulation, medium contact load, low power input, ruggedness, and compactness. Contacts are pure silver, will carry 10 amp., 110 volt, 60 cycle. Large terminals are throughout the unit; input is 1.5 watts d.c. or a.c. with 25 grams pressure on each back contact. By proper cross connection, this relay may be used as single pole, single or double throw, multiple or series break.

Hi-Lites (607)

To simplify the job of dead-ending conductors, the Ohio Brass Co. has added a stringing loop under the nose of three of its strain clamps, known as the Hi-Lites. This loop makes it possible to attach the "blocks"

for securing proper conductor tension directly in the clamp. Four sizes of these Hi-Lite strain clamps now have a stringing loop as illustrated.

MEETS EVERY DEMAND . . . AT LOWER COST

The all-important tensile strength that steel alone provides . . . the ruggedness to withstand vigorous punishment . . . the ability to outlast normal needs . . . are combined to the highest degree in *Crapo* Galvanized Steel Strand.

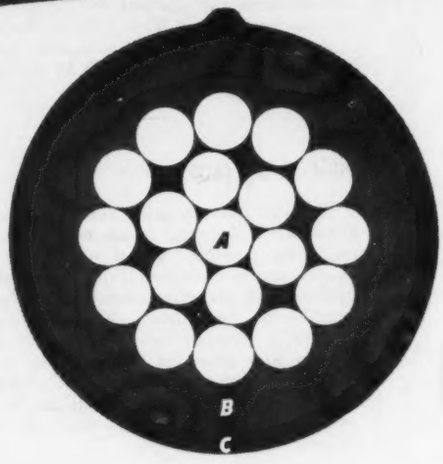
Definite economies both in construction and maintenance are made possible by this time-tested product. Its comparatively low initial cost, its workability in the field and its consistently trouble-free performance in service are significant reasons for its selection by engineers for the more important construction jobs.

The extra-durability of *Crapo* Galvanized Steel Strand is directly traceable to its heavy, ductile, tightly-adherent zinc coating, applied by the *Crapo* Process of galvanizing, and to the care and precision of manufacture. Every size and grade of *Crapo* Steel Strand is produced from selected steel, uniformly processed and laboratory tested to insure close adherence to required standards.

Crapo Galvanized Steel Strand is readily available in all standard grades and sizes from representative jobbers throughout the country. Consult the distributor of *Crapo* Galvanized Products near you, or write direct for further information!

INDIANA
STEEL & WIRE CO.
MUNCIE, INDIANA

SEALED INSULATION FROM TERMINAL TO TERMINAL



A

Conductor perfectly centered because insulation and sheath are applied by Okonite's strip-insulating process and vulcanized in a continuous metal mold.

B

Uniform wall of insulation as determined by service conditions (Okonite, Okolite or Okosheath, as required).

C

Protective bonded sheath of stable Okoprene—made of neoprene and containing no rubber—resists oil, chemicals, ozone, abrasion, sunlight and is non-inflammable.

In an Okoprene-sheathed cable, the rubber insulation is permanently sealed right up to the terminal. The vital insulation itself is never exposed to destructive action of air or light. There is no braid that must be cut back to prevent current leakage.

The Okoprene sheath (made of neoprene), is bonded to the insulation during the vulcanizing process and permanently protects it against attack by air, sunlight, ozone, oil or corrosive chemicals.

Okoprene sheaths are unaffected by the range of temperatures encountered under the most exposed conditions and will give long-lived protection to any type of Okonite insulation. Write today for Booklets OK-2009 and OK-2012, The Okonite Company, Passaic, N. J., offices in principal cities.

OKOPRENE – OKONITE

Sheathed Wires and Cables

RUBBER COVERED POWER CABLE • BUILDING WIRE • VARNISHED CAMBRIC • FLEXIBLE CORDS • LEAD ENCASED AND PARKWAY CABLES • ARMORED CABLE • CRESFLEX NON-METALLIC SHEATHED CABLE • SERVICE ENTRANCE CABLE • MAGNET WIRE • BARE WIRE

Get Your Quota

in the Profitable Rewiring Market With

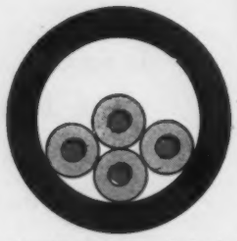
CRESCENT

Small Diameter Building Wire

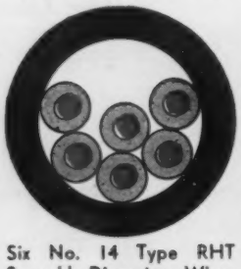
As you well know, the changes in the new National Electrical Code open up great profit opportunities for you in the rewiring of existing "bottle-neck" branch circuits with attendant increases in feeders—to say nothing of sales in fixtures and appliances.

For such rewiring, it will pay you to use CRESCENT ENDURITE Rubber Insulated Type RHT and CRESCENT SYNTHOL Synthetic Insulated Type SN SMALL DIAMETER BUILDING WIRES which are unexcelled in quality, ease of installation and permanence.

Two typical examples of the increase in capacity possible in existing ½" conduit are shown in the lower two figures at the right.



Four No. 14 Type R Code Wires permit 3450 Watts



Six No. 14 Type RHT Small Diameter Wires permit 6075 Watts

Four No. 14 and One No. 10 insulated neutral Type RHT permit 8100 Watts

CRESCENT INSULATED WIRE & CABLE CO. INC
TRENTON, NEW JERSEY

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Tri-State Supply Corp.
544 S. San Pedro St.

SAN FRANCISCO
Hodges & Glomb
1264 Folsom St.

KANSAS CITY—W. F. Howe & Co., 2627 McGee St.

CRESCENT ENDURITE SUPER - AGING INSULATION

Electroplating Silver (608)

Introduced by Rapid Electroplating Process, a new development in electroplating silver has been put on the market in the West. It results in a more efficient overcoat with superior wetting qualities as well as improved plating compound by means of which silver platings of .0002 to .001 in. thickness can be quickly

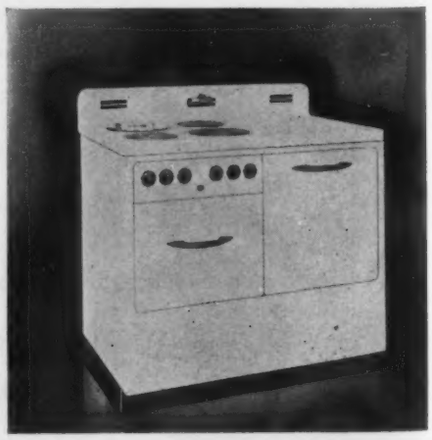
and economically applied by anyone without previous experience. This process is combined in a compact portable kit, complete, ready for operation. Current is supplied by transformer-rectifier or dry batteries.

Pilot Relay (609)

The Photoswitch pilot relay developed by Photoswitch Incorp., is an electronic switch rendering possible control of large currents by delicate mechanisms, liquids, or extremely light contact pressure normally not capable of being used to control electrical currents. Control is effected by the delicate touching of two fine wires or contacts; or by their being short-circuited by a liquid or even any moist material. Only three-millionths of an ampre may in this way control any current desired.

Frigidaire Range (610)

Adding to its line a new low-priced standard household electric range, Frigidaire declares that this new model includes all basic construction features of other standard and deluxe models. There is a full-size twin-unit

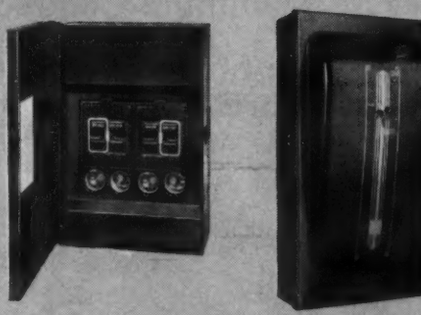


oven, high speed broiler, regular speed-heat units with five heats, Thermizer cooker, one-piece stainless porcelain cabinet, silver contact switches and armored wiring.

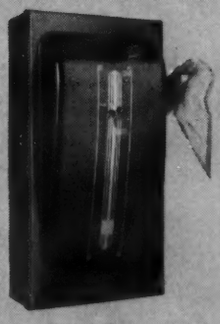
BULL DOG.....

Offers A Complete Line of

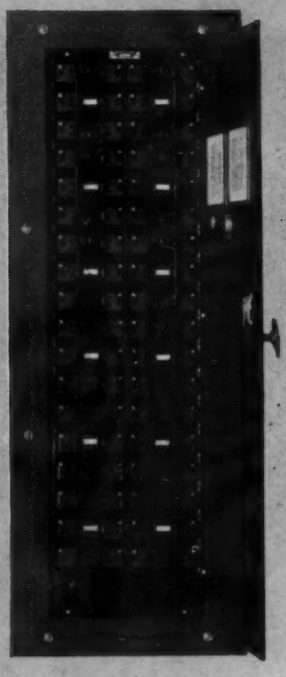
SERVICE EQUIPMENT, SAFETY SWITCHES, PANELBOARDS, SWITCH-BOARDS and BUSTRIBUTION DUCT.



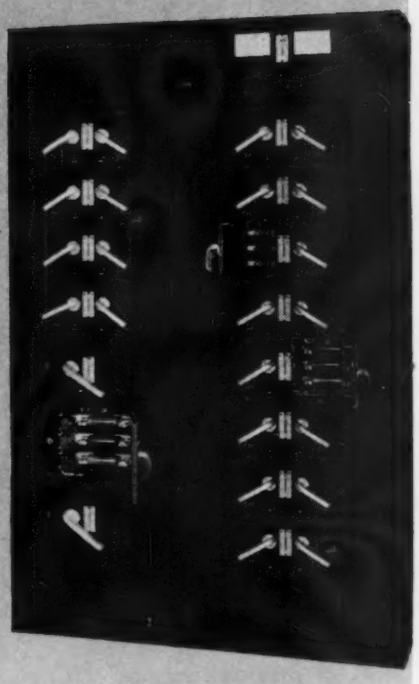
Service Equipment with Range and Lighting Circuits



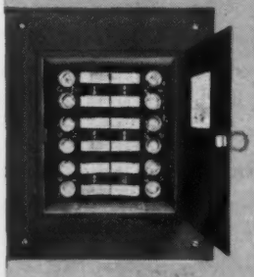
Safety Switches with Vacu-Break Arc Control



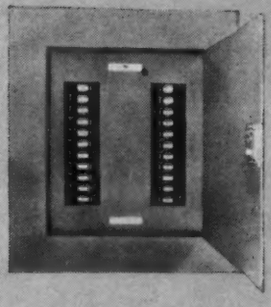
SAFtoFUSE Distribution Panels for Power & Light



Compact Switchboards incorporating Vacu-Break Switch Units



Rocker Type Lighting Panels from 4 to 40 Circuits



CIRCUIT MASTER PANELS (automatic circuit breaker) From 4 to 42 Circuits

PACIFIC COAST ASSEMBLER REPRESENTATIVES

MULLENBACH ELECTRICAL MFG. CO.
1025 East 16th Street
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SAFETY SWITCHBOARD & MFG. CO.
528 Folsom Street
SAN FRANCISCO, CALIFORNIA

COAST ELECTRIC & MFG. CO.
1720 N. E. Sixth Ave.
PORTLAND, OREGON

BULL DOG ELECTRIC PRODUCTS CO.
DETROIT, MICHIGAN

Six BIG

New Allis-Chalmers Distribution Transformer Gives You Greater Value... AT NO EXTRA COST!

1 Revolutionary Cadmium-plated 3-Way Terminal Cuts Installation Time... Simplifies Wiring Job... Minimizes Electrolytic Action on Copper or Aluminum Conductors.

2 New, Durable Steel Tank, Tested Under Pressure ... Prevents Oil Leakage ... Assures Long Life.

WE SINCERELY believe your dollars go farther when you buy the new Allis-Chalmers Distribution Transformer ... with all its extra-value features that point to *greater* all-around dependability at *lower* cost!

But we want you to be the judge. That's why we say, "Look at the new Allis-Chalmers Distribution Transformer!"

Notice the big cadmium-plated 3-Way Terminals, made to save man hours ... eliminate complicated wiring jobs and special fittings. And the husky steel tank tested under pressure so you can be sure your Allis-Chalmers Distribution Transformer won't leak oil.

Run your hand over that finish on the tank. It's as smooth as the paint job on your car ... and as positive a protection against rust as you can get.

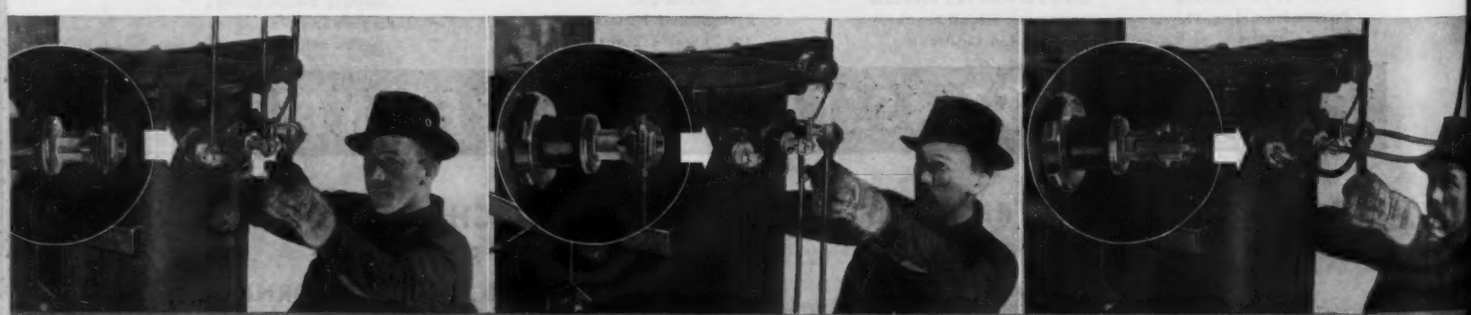
Take off the cover and check those coils on the inside. There's new perfection there ... dictated by over 40 years of Allis-Chalmers engineering experience in building transformers for utilities all over the world.

And if you'll look close, you'll see that all windings are double insulated for added safety. That means *double* protection against winding failures.

Then look at the price! You'll be amazed to learn that this new Allis-Chalmers Distribution Transformer ... with all its engineering advancements ... actually costs no more than ordinary distribution transformers!

For the whole story of *all* the extra-value, cost-cutting features you get in the new Allis-Chalmers Distribution Transformer ... call the nearest Allis-Chalmers district office. Or write for Bulletin B-6096, Pittsburgh Works, Allis-Chalmers Mfg. Company.

A-1234



SEE HOW THE NEW 3-WAY TERMINAL WORKS! First and second pictures show how simply and easily leads can be brought to the transformer from both top and bottom. But you don't stop there! For the third picture illustrates an *extra* advantage you get with no other terminal! If necessary, leads can be brought straight out from the transformer, without making an extra bend in the conductors or complicating the wiring job. Notice how the tightening tool travels in an ***up and down*** direction eliminating the chance for accidental shorts across the secondary terminals. Notice, too, that a standard lineman's wrench is used. No special tools are needed. You don't have to buy extra fittings. Heavy cadmium plating of the 3-Way Terminal makes it possible to be used with ***both*** copper and aluminum conductors with a minimum of electrolytic action.

A-C ALLIS-CHALMERS DISTRIBUTION

Reasons why

3 Extra-heavy Porcelain Coordinated Bushings with Liberal Creepage... Offer Maximum Reliability Under Fog, Dust, Chemical, or Other Adverse Operating Conditions.

4 Double Conductor Insulation Provides Double Safety Against Winding Failures.

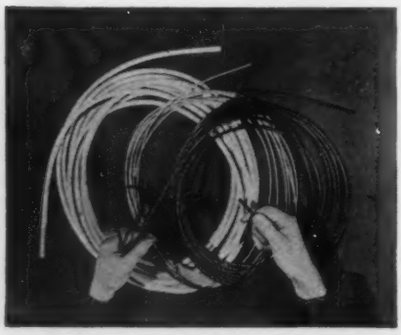
5 New Spra-bonderizing...Plus Triple Coat Automobile Finish... Gives Positive 4-Way Protection Against Rust and Corrosion.

6 Time-proven Core and Coil Construction... Designed for Years of Efficient, Service-free Operation.

TRANSFORMERS *Cut Operating Costs*

Extruded Tubing (611)

A development in plastic materials is an extruded tubing now made in continuous lengths by the Irvington Varnish & Insulator Co. Believed to be the first extruded tubing developed for electrical insulation in the United States, it is particularly fitted for use in the communications, radio and electrical fields and other fields where flexible tubing



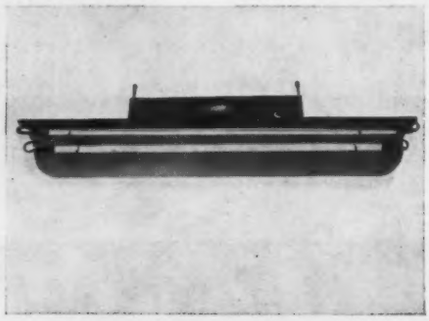
plays an important part in wire insulation against heat, moisture, oils, etc. This new product is produced in five standard colors from size No. 20 to 5/8" but can be manufactured in different sizes and wall thicknesses as specified.

Induction-Cylinder Relay (612)

A single-unit induction-cylinder relay, for complete high-speed (one-cycle) pilot-wire protection of transmission lines is now manufactured by the General Electric Co. It combines the conventional opposed voltage pilot system with the modern induction cup-type relay element to give a pilot relay system with the following features: a single cup element for each terminal; requires only two pilot wires; normally circulates no current through the pilot system; will not trip out of step; has percentage slope characteristic; is easy to adjust.

Flourescent Luminaire (613)

Development of a new two-tube fluorescent luminaire designed for industrial areas has been introduced by G-E Lamp Dept. An outgrowth of the familiar Cooper Hewitt fluorescent lamp, the fixture consists of a self-contained auxiliary mounted on a porcelain enamel reflector. It is rated at 200 watts, and operates two 85-watt RF tubes (each 58 in.



long) which have a combined initial rating of over 8,000 lumens. When mounted on 10-ft. centers, this new unit will provide adequate industrial illumination and more light from a lesser number of tubes than any other equipment now available is able to produce.

Floodlight (614)

A new floodlight, designed specifically for the correct illumination of service stations and known as the "Servisflood," has been introduced by Westinghouse. Outstanding feature of this new device is its dual beam, providing a wide shaft of light with horizontal top cutoff for yard illumination, and a narrow

beam for building highlighting. This is accomplished by a composite Alzak aluminum reflector, the bottom half of which has a polished surface, the top half a diffused surface. Floodlight housing is closed and has a heat-resisting glass cover, making the assembly complete weather-proof, dust and bug tight. Three types are standard.

Luxorlite (615)

A lensed lighting fixture made by the Wuelker Lighting Co., is the "Luxorlite" to be used for any type of installation where a direct flood of high-quality light is needed below, without light source glare. It also may be used as an indirect light to illuminate the

ceiling for general illumination. This unit may be used without "fresnal" lense, using a colored or clear "beauart" lense or louver instead. All units are enameled ivory color with burnt amber trimmings.

New Landers-Frary Range (616)

A special priced leader model Range 1140 has recently been added to the Landers, Frary & Clark line of electric ranges for 1940. Known as the "Meteor," this electric range has a large fast-bake oven, universal superheat surface units and economy cooker, five-heats, automatic oven control

SAVE 25% ON FITTING COSTS!

TELESCOPE BM SYSTEM

B-M connectors and couplings, plus the Patented B-M Indenter shown below, are all you need. Use this SIMPLE METHOD . . . cut down your fitting costs and handling.

ALSO:
- Save 25% to 50% on time.
- Eliminate complications.
- Quick, easy installations.
- Stronger, neater connections.
- No fussing with nuts to tighten.

For More Profit on Every Job!

$1.35 Buys the One Tool Needed

This one patented tool (1/2" B.M. Indenter) handles 80% of all installations. Pays for itself many times over on the very first job.

Approved by Underwriter's Laboratories

Distributed By:

The M. B. Austin Co., Chicago, Ill.
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Clayton Mark & Co., Evanston, Ill.
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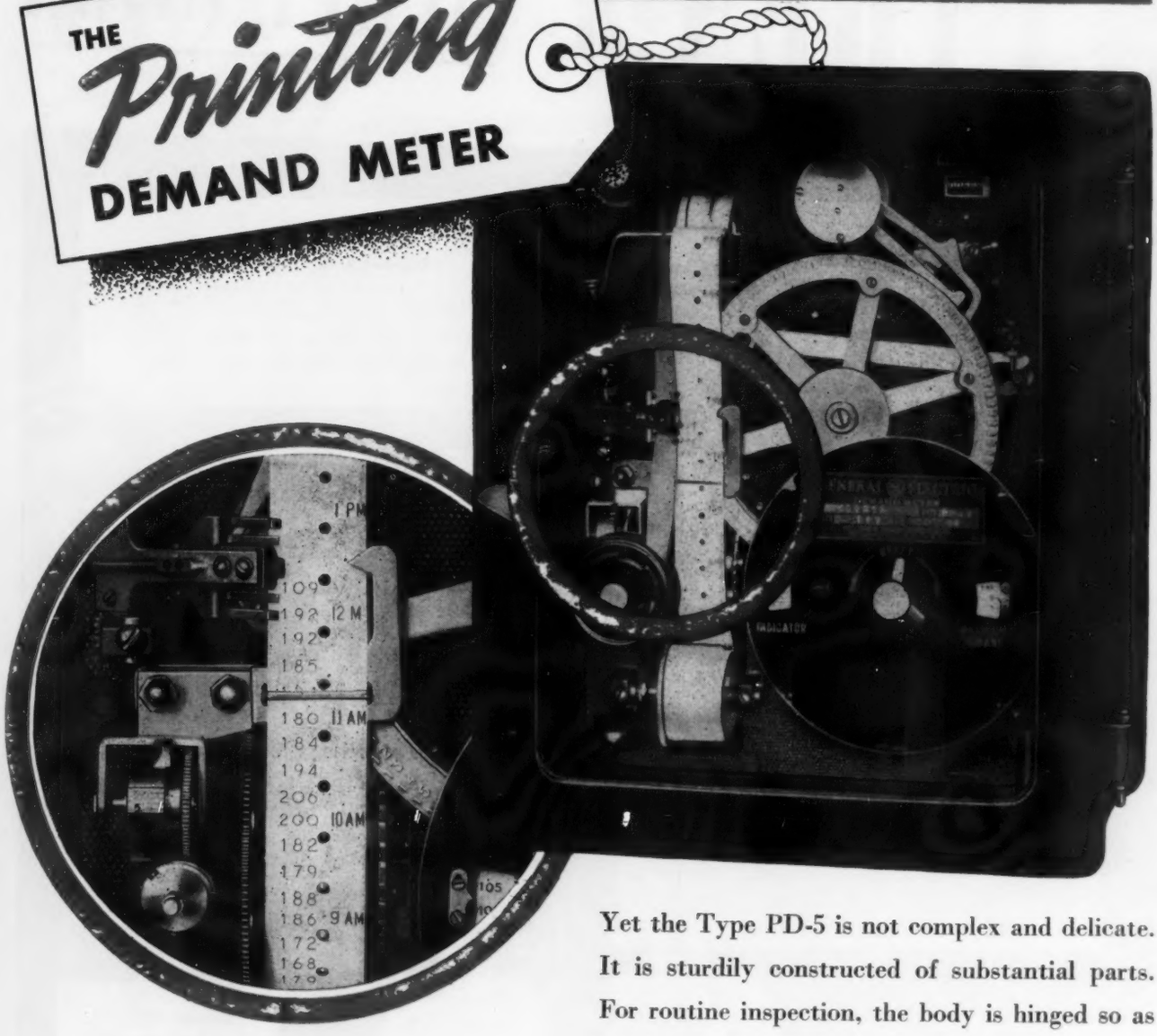
BRIEGEL METHOD TOOL CO., Galva, Illinois

FOR YOUR IMPORTANT LOADS—

THE *Printing* DEMAND METER



THE Type PD-5 printing demand meter possesses inherent advantages over a recording device in that it eliminates errors caused by expansion and contraction of the paper chart, variations in ruled gradations, and shifting of the chart.

Yet the Type PD-5 is not complex and delicate. It is sturdily constructed of substantial parts. For routine inspection, the body is hinged so as to give a much-desired accessibility.

These are but a few of the advantages this meter offers. For further information, be sure to get in touch with your nearest G-E meter specialist or write for Bulletin GEA-3125. General Electric Co., Schenectady, N. Y.

GENERAL ELECTRIC

605-1

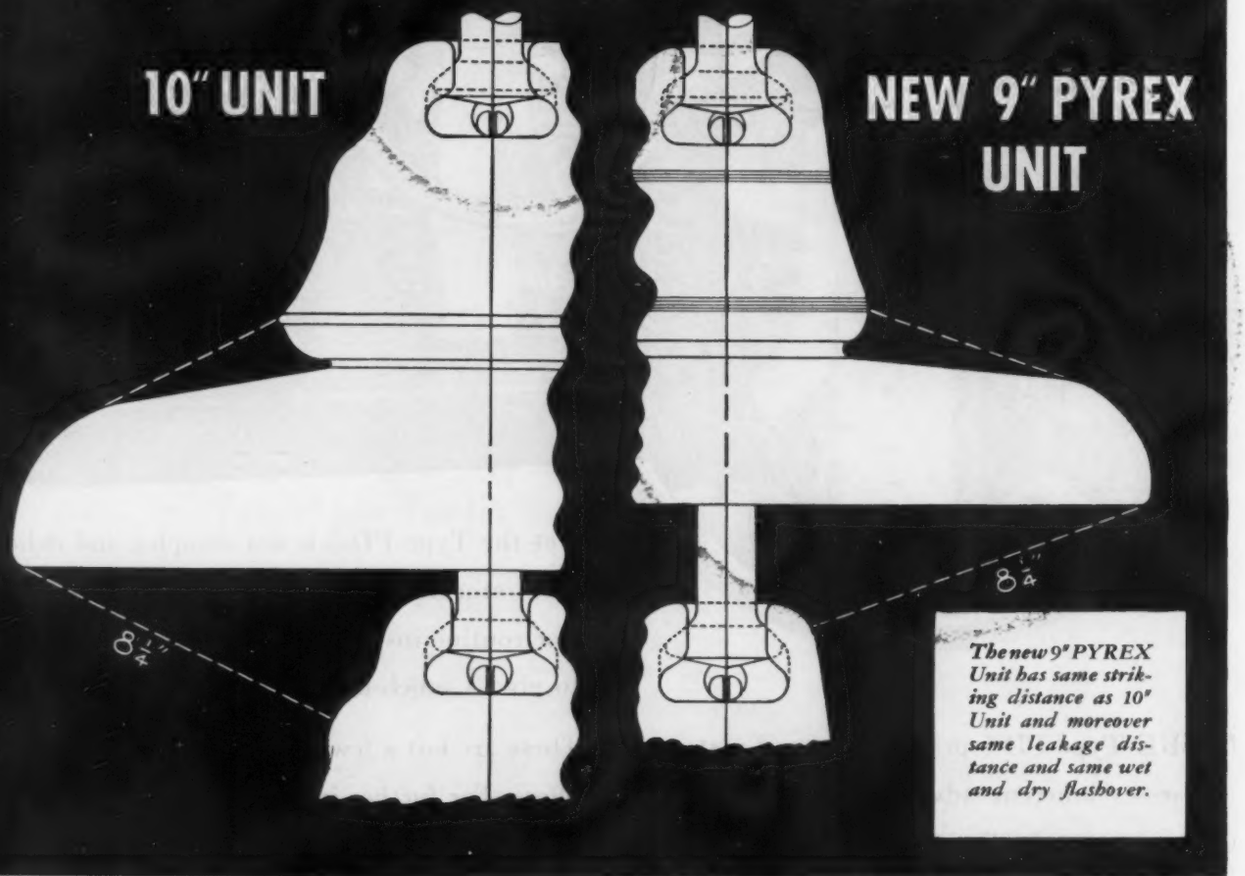
Announcing

PYREX 9" SUSPENSION

CHECK WITH LARGER, HEAVIER UNITS THAT COST YOU MORE!

SPECIFICATIONS FOR 9" UNIT:

Mechanical and electrical rating, pounds	15,000
Dry flashover, volts	81,000
Wet flashover, volts	49,000
Leakage distance, inches	11¼
Impact resistance, inch-pounds	75
Net weight, pounds	6½
Packed weight, each pounds	7½
Standard package	6



The new 9" PYREX Unit has same striking distance as 10" Unit and moreover same leakage distance and same wet and dry flashover.

CORNING *means* Research in Glass

Pyrex Insulators BRAND

INSULATORS!

SEE HOW YOU SAVE!

YOU can save money *three ways* with this sensational new 9″ PYREX Suspension Insulator! First cost is less than any other unit on the market providing the same insulation! Light weight, (7½ lbs. packed instead of customary 12 lbs.), means a big saving in shipping and other charges! On general construction costs alone, this new light-weight unit can effect important savings!

Three years in the making, this new PYREX Insulator design has the same leakage distance and wet and dry flashover characteristics as the heavier and more expensive 10″ units. It also has a special cement developed in conjunction with Corning for coupling glass to metal and this cement has superior resistance to weathering and temperature changes. Exclusive tempering processes developed by Corning give this glass insulator unusually high mechanical strength, permitting use on all standard construction.

Investigate this new money-saving PYREX Suspension Insulator. Mail coupon for specifications and complete test data today!

1. Costs less than any other unit on the market providing the same protection.

✶

2. Light weight (7½ lbs. packed) cuts your transportation costs!

✶

3. Light weight saves time and money in the field.

This revolutionary unit could be produced only in Pyrex Brand Glass, because of

1. **Tremendous Inherent Dielectric Strength**
2. **Great Mechanical Strength Through Tempering**
3. **Improved Cement and Assembly Technique**

MAIL COUPON TODAY

Corning Glass Works, Insulation Division
Corning, N. Y.

Please rush me complete specifications, together with mechanical and electrical test data, on the new 9″ PYREX Suspension Insulator.

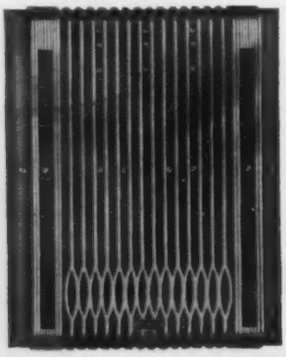
Name.....

Company.....

City.....State.....

Heetaires (617)

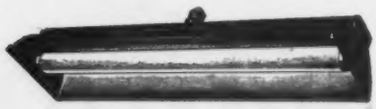
Two major contributions to heating comfort are introduced in a new line of built-in-wall electric Heetaires manufactured by Markel Electric Products, Inc. One innovation is a heater that provides both radiant heat and a steady current of fan-forced heat. Another



unit is a fan-type heater that uses a simplified method of handling air currents. This method assures a steady output of hot air, while incoming air cools the heater box and grill.

Fluralamps (618)

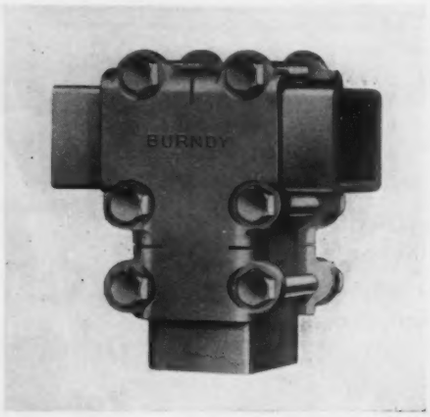
New and improved fluorescent lighting equipment is now available at the Eagle Mfg. Co. in the company's Fluralamp Line. A Fluralamp adaptor, for a. c. or d. c. fluorescent lighting has been designed for general or concentrated lighting purposes, such as desks, showrooms, drafting rooms and printing shops. Costly and noisy reactors and transformers have been eliminated. Power factor corrected



practically 100%. Unit is extremely light in weight.

Connectors (619)

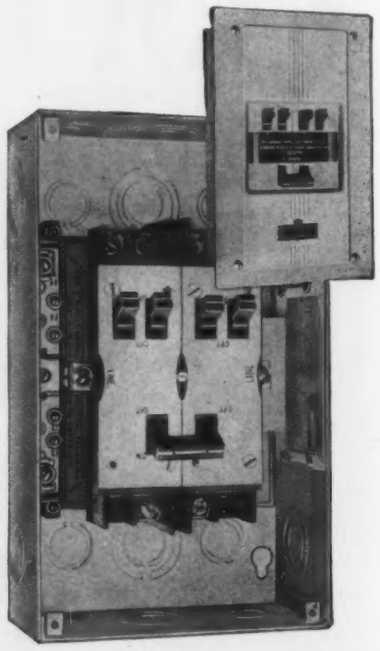
A complete line of electrical connectors and bus supports for square tubular bus, both ventilated and unventilated types, is now manufactured by the Burndy Engineering Co.,



Inc. Clamping pressure is exerted on the corners of the tube and thereby buckling of the tube walls is prevented.

Case Construction Change (620)

A change in case construction as used with their type MB Multi-Breaker assemblies has been announced by Cutler-Hammer Inc. The device now has an insulated groundable neutral combining the construction of the insulated and grounded neutral. Simply inserting a screw in a tapped hole of the insulated neutral bar grounds the neutral and the case.



These assemblies are available from one to 16 breakers, which can be arranged for two or three-pole solid neutral circuits for a.c. service. This type has either flush or surface mounting types.

G-E Floodlight (621)

A new aluminum floodlight, designed for sports lighting, but applicable to other installations has been introduced by General Electric's lighting division. The floodlight features a vertical adjustment of 240 degrees, a slide-door type door, and a resetting ring. These provide maximum safety and simplicity in servicing, a job ordinarily difficult because sports floodlights are mounted 50 to 100 ft. high on crossarms or steel framework. It is supplied with the Alzak-processed reflectors with polished reflecting surface for a narrow beam or with etched reflecting surface for a wide beam.

Safecote Wire (622)

In answer to the demand for larger copper or more wires in existing conduits, "Dilec" Safecote, a small diameter wire in sizes from 14 to 4/0 incl., has been developed by National Electric Products Corp. "Dilex" Safecote patents cover the application of a fibrous

covering over the rubber insulation, composed of a series of cotton yarns laid side by side in contact relation, overlaid by a special rayon binder thread. This provides practically 100% coverage of the rubber insulation as compared to about 61% covered provided by the braided type.

ELECTRIC CONTROLS

Every item in the line of Ward Leonard Controls is an outstanding product of sound engineering, practical designing and careful manufacture . . . each planned to meet a specific set of conditions in industry. The absolute dependability and ruggedness of Ward Leonard Controls make them ideal controls to be built into machines and equipment the maintenance of which is expensive or difficult.

Bulletins available describing

RELAYS VOLTAGE REGULATORS CONTACTORS
RHEOSTATS MOTOR STARTERS
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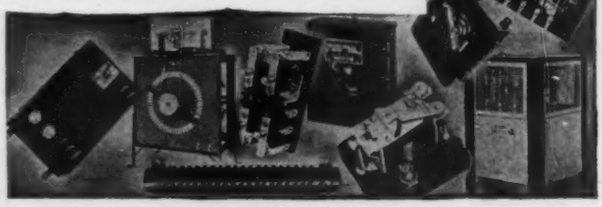
Northwestern Agencies, 2411 First Avenue, Seattle, Wash.
A. R. Slimmen, 445 East 3rd Street, Los Angeles, Calif.
Electric Material Co., Inc., 163 2nd Street, San Francisco, Calif.

Electrical Control Devices Since 1892

Send for bulletin of interest

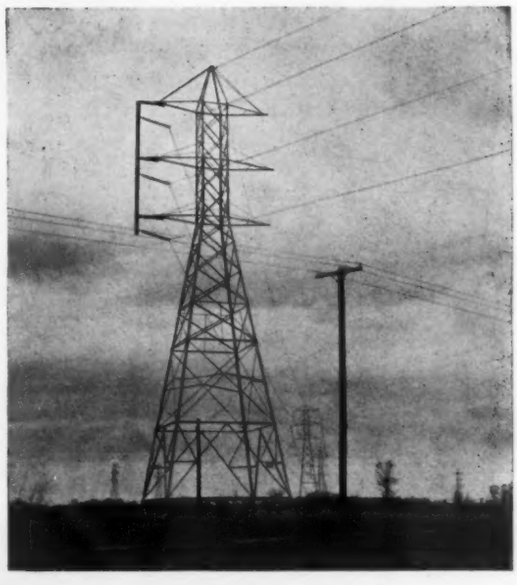


"It ain't often a youngster like you, Rural Line, gets a close-up of an old timer like this A.C.S.R. hi-line. No reason why you shouldn't be neighbors for a l-o-n-g time. You're made of the same stuff."

Operators of A.C.S.R. lines know Aluminum as a highly successful conductor material. Strung according to Alcoa engineering standards, it makes the finest possible construction.

A.C.S.R. provides high strength and durability, permitting low cost, long-lived construction. It has the conductivity necessary for future growth of load. Hi-line or rural line, there's an A.C.S.R. conductor offering the most economical combination of these properties.

ALUMINUM COMPANY OF AMERICA, 2132 Gulf Building, Pittsburgh, Pennsylvania.



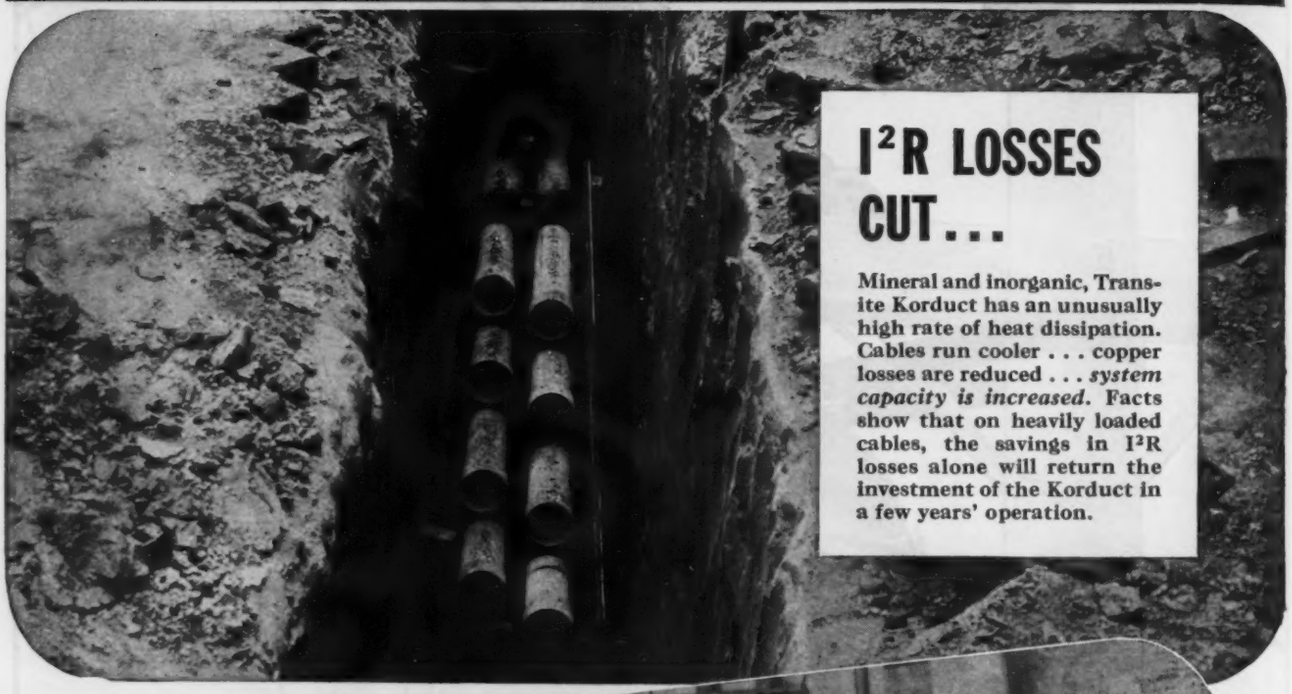
A·C·S·R

Aluminum Cable Steel Reinforced

FOR RURAL LINES AND POWER TRANSMISSION

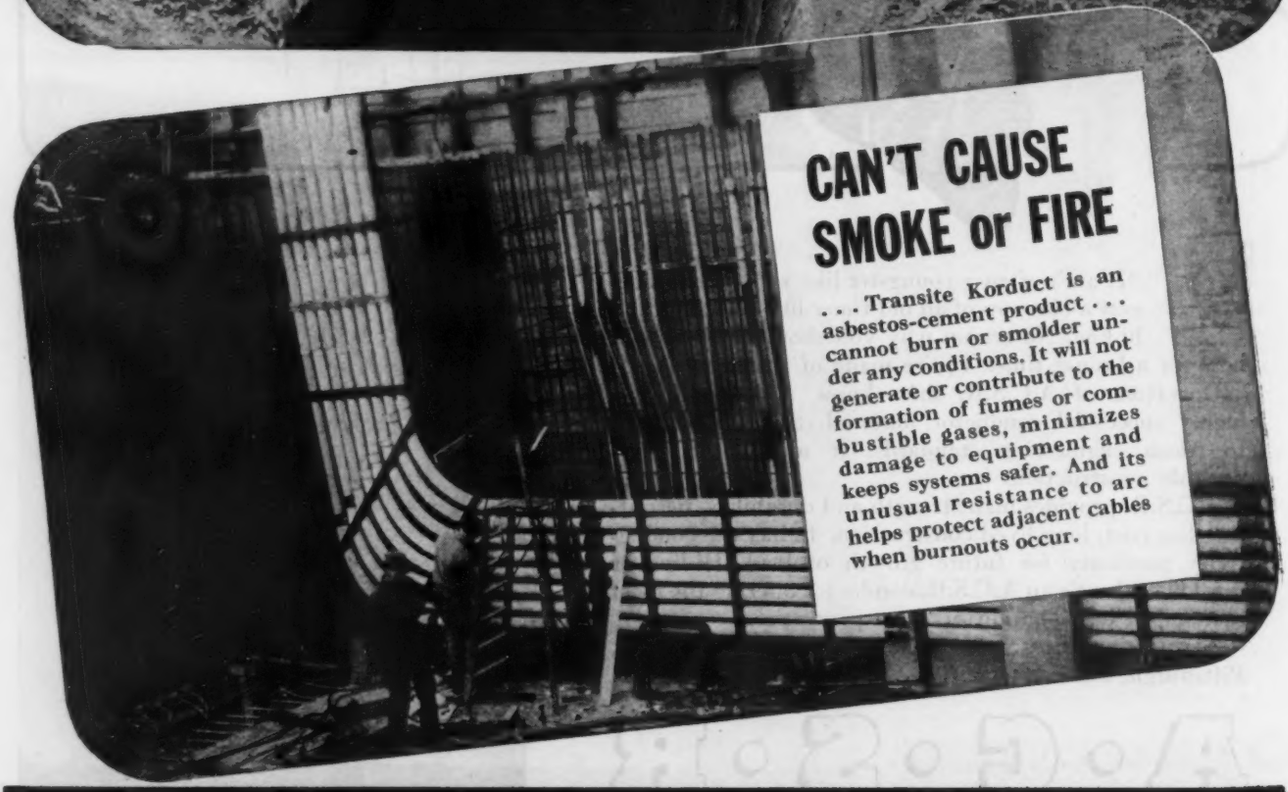
MAKE DUCT SYSTEMS

Like all other equipment, cableways should play an import-
. . . more profitable. Read how you can add new efficiency



I^2R LOSSES CUT . . .

Mineral and inorganic, Transite Korduct has an unusually high rate of heat dissipation. Cables run cooler . . . copper losses are reduced . . . *system capacity is increased.* Facts show that on heavily loaded cables, the savings in I^2R losses alone will return the investment of the Korduct in a few years' operation.



CAN'T CAUSE SMOKE or FIRE

. . . Transite Korduct is an asbestos-cement product . . . cannot burn or smolder under any conditions. It will not generate or contribute to the formation of fumes or combustible gases, minimizes damage to equipment and keeps systems safer. And its unusual resistance to arc helps protect adjacent cables when burnouts occur.

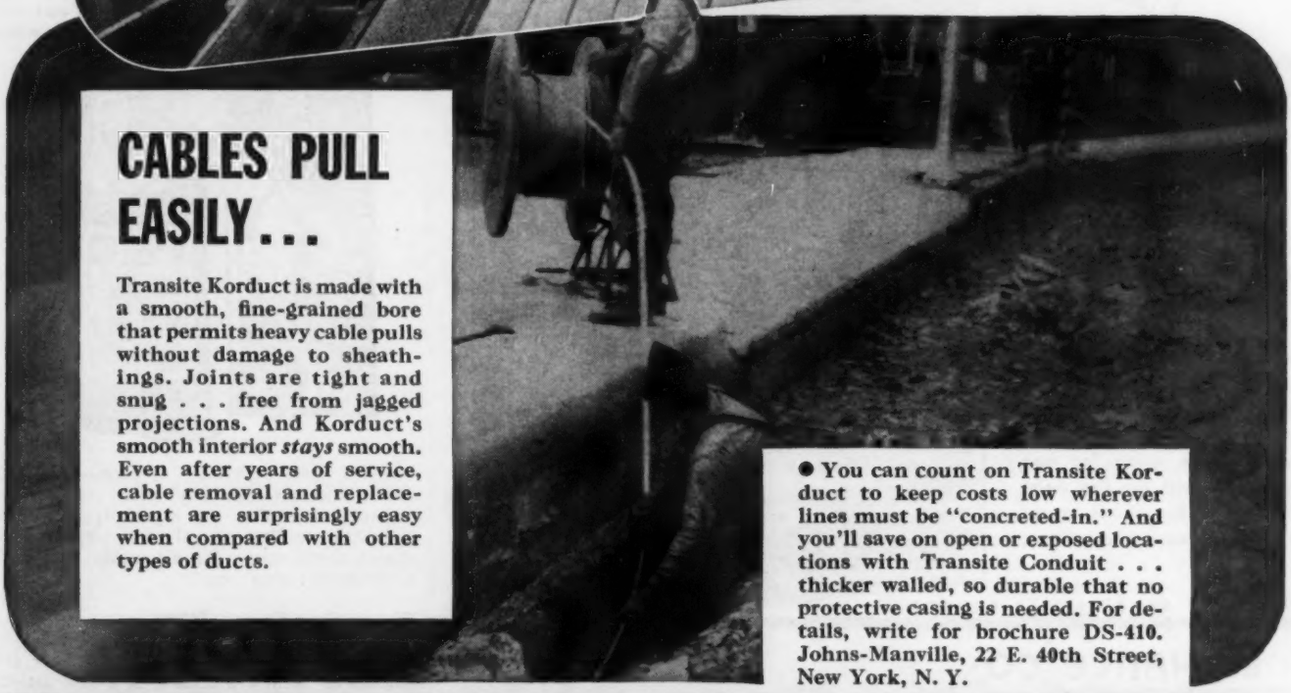
Johns-Manville TRANSITE

PAY A FULL RETURN...

ant part in making electrical distribution less expensive and economy to your system with J-M Transite Korduct

NO CORROSION TROUBLES...

Maintenance stays low on Transite Korduct systems because this better duct contains no metal or organic materials. It does not rust, rot or decay. Even on systems that are continually under water, Korduct remains in good condition. And it can be stored indefinitely in exposed locations without deteriorating.



CABLES PULL EASILY...

Transite Korduct is made with a smooth, fine-grained bore that permits heavy cable pulls without damage to sheathings. Joints are tight and snug . . . free from jagged projections. And Korduct's smooth interior *stays* smooth. Even after years of service, cable removal and replacement are surprisingly easy when compared with other types of ducts.

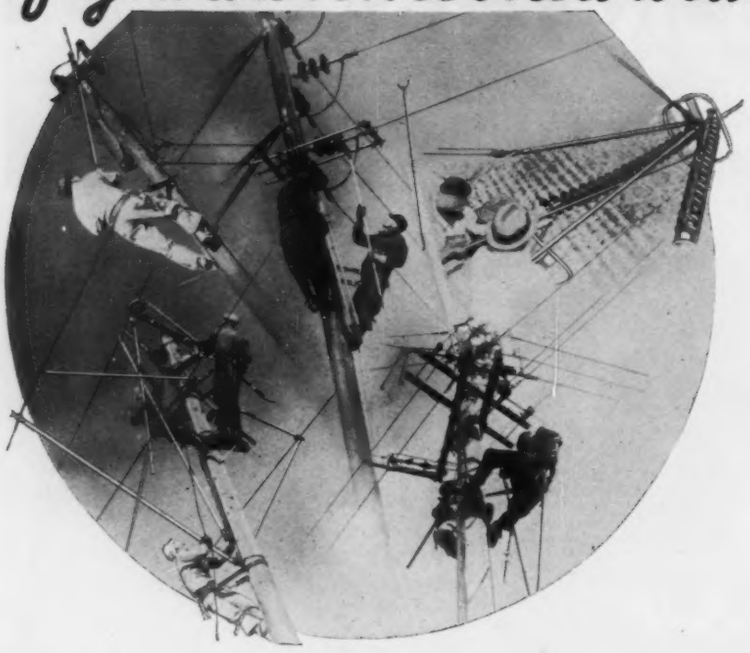
● You can count on Transite Korduct to keep costs low wherever lines must be "concreted-in." And you'll save on open or exposed locations with Transite Conduit . . . thicker walled, so durable that no protective casing is needed. For details, write for brochure DS-410. Johns-Manville, 22 E. 40th Street, New York, N. Y.

DUCTS

TRANSITE KORDUCT for installation in concrete

TRANSITE CONDUIT for use underground without a concrete envelope and for exposed locations

If you are concerned with...



...LIVE LINE MAINTENANCE OR LIVE CIRCUIT OPERATIONS

you need this **BOOK-**

If you buy, use, or specify hot line maintenance tools, hot tap clamps, grounding equipment, or hot line fused tappers, this loose leaf book will make your job easier and keep you posted on the latest developments. Nothing has been spared to make it a thoroughly complete, comprehensive, and easy to use guide for men concerned with live line maintenance or live circuit operations. Send for your copy today.

Yours for sending this coupon

A·B·CHANCE CO. Utilities Division

ALLEN AT WILSON — CENTRALIA MISSOURI

Gentlemen:
Please send without obligation your catalog of Tips Electrical Live Line Equipment.

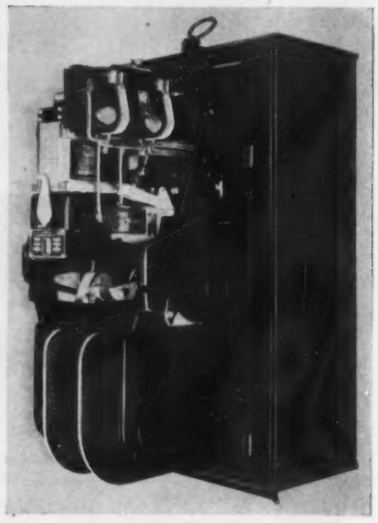
Name _____ Title _____

Company _____ Address _____

THERE'S NOTHING TOO GOOD WHERE LIFE IS AT STAKE

New Circuit Breaker (623)

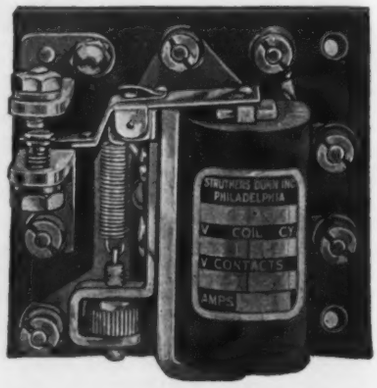
Illustrated is the I-T-E Circuit Breaker Co.'s new 600 amp., three-pole, Type KB circuit breaker, mounted in an individual steel enclosure of the pull-box type. The interrupting ability of the new KB is such, that in a dust-



proof enclosure, it can be rated 20,000 R.M.S. It is available, electrically or manually operated, in ratings up to 600 amp. for open mounting or for cubicle mounting in switchgear.

Sensitive Relay (624)

A new sensitive relay for exacting applications where a high degree of sensitivity must be coupled with high-speed, low-power operation, has been introduced by Struthers Dunn Inc. They operate on only .008 watts, d.c.; or 0.10 volt-amp. at 60 cycles a.c.; and will operate on as low as ¼ of rated power where



reduced contact pressure is permissible. Affording an exceptionally wide current and voltage range, they are especially suited for use with sensitive control units such as mercurial thermostats; for electronic uses such as welding timers; etc.

Fluorescent Fixture (625)

Fluorescent lighting for homes, offices and salesrooms is now available in a new artistic fixture of modern streamline design with two, three or four 18 in. or 24 in. fluorescent tubes. Made by the Mozart Specialty Corp., it is supplied in English bronze with chromium plated trim. Overall fixture lengths are 39 in. for 15 watt tubes and 45 in. for 20 watt tubes. The auxiliary reactors, power factor correctors and starting switch are self contained.

FLAMENOL

BUILDING WIRE

(Small Diameter—For Rewiring Existing Raceways)

Contributes to Great Rewiring Program

Available in Sizes 14 to 4/0 Inclusive

General Electric is co-operating with the industry in launching a great rewiring program by offering small diameter Flamenol Building Wire. With it wattages can be increased inexpensively. The reduction in diameter size permits the installation of more wires and wires of larger capacity in existing raceways (pending 1940 Code). See table below for comparative over-all diameters.

INCREASED COPPER

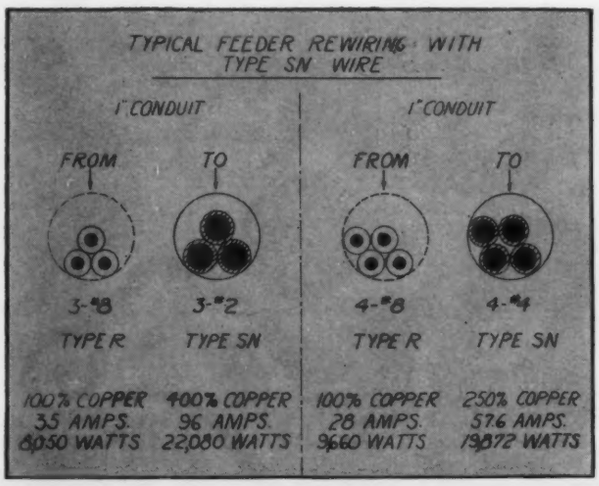
Now effective copper in existing raceways can be increased as much as 400 per cent by rewiring with small diameter Flamenol Building Wire. The rewiring job can be complete including new feeders, new sub-feeders and new branch circuits because Flamenol Building Wire is available in sizes 14 to 4/0 inclusive.

SYNTHETIC COMPOUND INSULATION

Small diameter Flamenol Building Wire is insulated with a plasticized polyvinyl chloride compound which has high dielectric and mechanical strength. It is tough, long aging, flame retarding and is resistant to oils, acids, alkalies and moisture. The compound serves both as an insulation and as a finish. Flamenol Building Wire is available in a variety of bright, permanent colors. Color goes all through the insulation and can easily be determined by cleaning or scraping if the wire becomes soiled.

ADDITIONAL INFORMATION

For samples and further information see the nearest G-E Merchandise Distributor or mail the coupon below.



COMPARISON OF DIAMETERS

Size AWG	Approximate Overall Diameter (In.) Rubber Covered Types R, RP, RH	Approximate Overall Diameter (In.) Flamenol Type SN	Size AWG	Approximate Overall Diameter (In.) Rubber Covered Types R, RP, RH	Approximate Overall Diameter (In.) Flamenol Type SN
14 Sol.	.19	.130	1 Strd.	.56	.496
12 Sol.	.21	.147	1/0 Strd.	.60	.537
10 Sol.	.23	.168	2/0 Strd.	.65	.583
8 Strd.	.32	.246	3/0 Strd.	.70	.634
6 Strd.	.40	.314	4/0 Strd.	.76	.692
4 Strd.	.45	.363		up to 2,000,000 CM	
2 Strd.	.51	.423			

General Electric Company
Section WF-0236
Appliance and Merchandise Department
Bridgeport, Connecticut

Sirs: Please send me samples of Flamenol Building Wire.

Name.....

Address.....

City..... State.....

GENERAL ELECTRIC

Monarch ELECTRIC

KITCHEN-HEATER MODELS

The Line that Opens the Door to a Vast Rural Electric Range Market

Monarch "heater" models are designed from the ground up for electric cooking and fuel heating by men who know both problems. Each model is a standard Monarch electric range built as a single, compact unit with a "circulating" type heater that draws cold air from the floor and promotes efficient heating through air motion.

It is the only kitchen heater made with malleable iron lids and a deep return flue to reduce stack loss. It has standard Monarch "duplex" grate bars for efficient burning of both coal and wood—or can be had with a power, pot type oil burner.

Thousands of potential electric range prospects need heat in the kitchen and will not adopt electric cooking unless they can have it conveniently. With this line YOU can sell them.

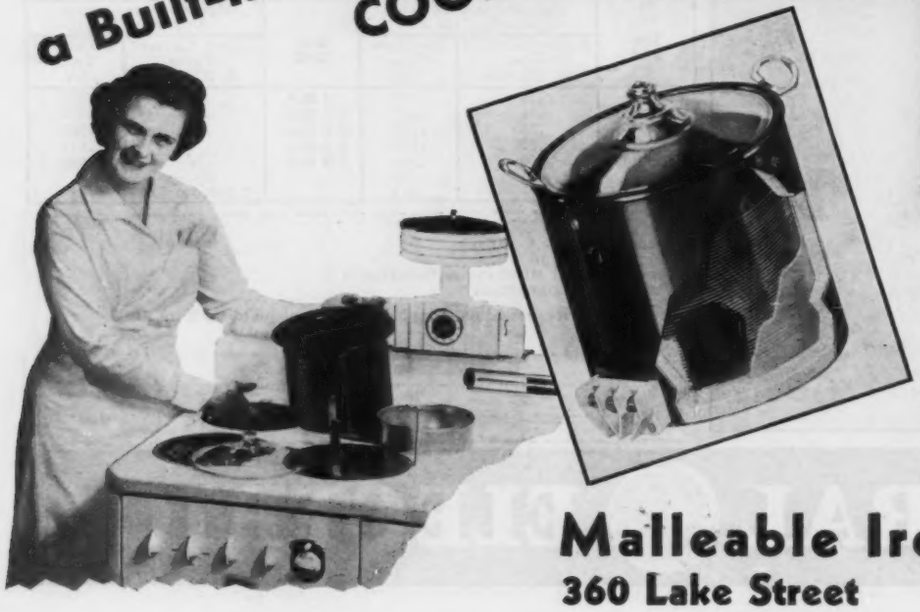
Upper left—
Model LNH87NC

Left—Model LNH17NC

Below—Model H47NC

All above equipped with circulating type heater, 17" oven, "SIDE-HEET" Cooker. Choice of open or closed surface units and finished in Porcelain Enamel.

The ONLY Electric Range with a Built-in SIDE HEAT COOKER

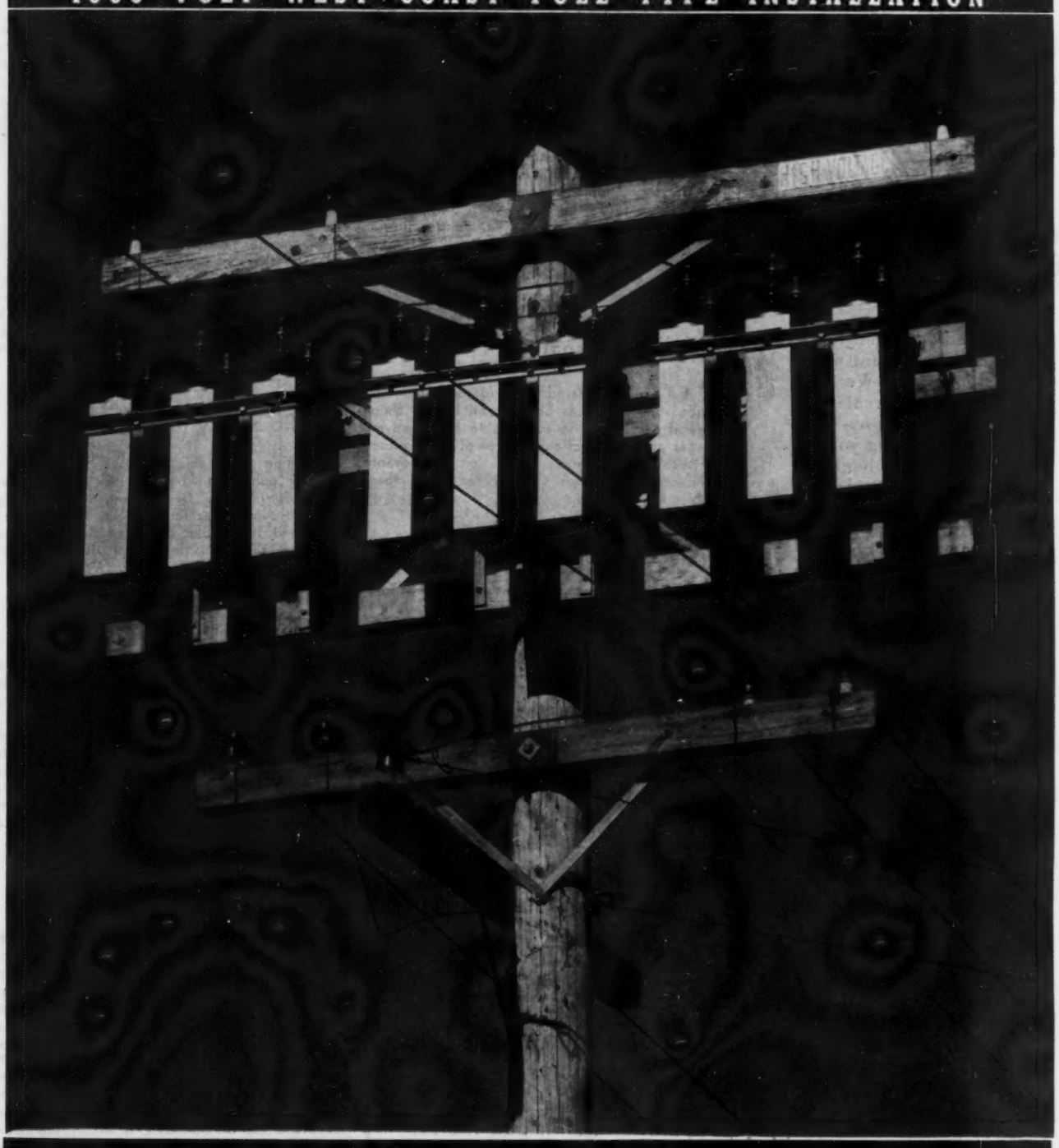


← Patented! Exclusively Monarch! Vastly different from other cookers where bottom heat is used only for boiling and steaming. Monarch's cooker serves for boiling and steaming—and for ROASTING and BAKING as well, at a fraction of the cost of oven cooking. Note the heating element around the sides of the well and the heavy rock wool insulation.

Malleable Iron Range Co.

360 Lake Street Beaver Dam, Wis.

4000 VOLT WEST COAST POLE TYPE INSTALLATION



FAST CAPACITORS

for IMPROVED VOLTAGE REGULATION—BETTER POWER FACTOR
INCREASED REVENUE—CAPACITORS FOR EVERY INDUSTRIAL NEED

John E. Fast & Co.
Established 1919

3123 NORTH CRAWFORD AVE.
CHICAGO, ILLINOIS

West Coast Representatives: WALTHAM, DE WITT & KRUSI, 630 Monadnock Building, San Francisco, Cal.

How We Help the Professions to Save

Valuable Time

You and your assistants are under constant pressure for time. We can help you in a real way with our Bank-by-Mail Service, enabling you to do most of your banking when convenient, day or night, right in your office. Why not open an account today, by mail?

CROCKER FIRST NATIONAL BANK
OF SAN FRANCISCO
California's Oldest National Bank
Member Federal Deposit Insurance Corporation

PRODUCT DATA

Connectors (626)

Splitbolt connectors, incorporating a new principle for permanently holding two wires together the tightest way, are described in a folder by Sheldon Service Corp. This new unit offers greatest gripping pressure on wires, increased contact bearing area, copper flowing reduced, maximum pull-out pressure through vibration-proof assembly. High tensile-strength alloys are used in construction with nickless corners. The unit is corrosion resistant.

Steel Poles (627)

A 4-page illustrated folder describing Monotube steel poles has been issued by the Union Metal Mfg. Co. In addition to listing advantages and construction features of the product, it also contains many installation photographs showing the various services for which these poles are adapted.

Telechron Clocks (628)

Spring and summer additions to the Telechron Electric Clock line are introduced in a six-page supplement to the Warren Telechron Co.'s regular catalog. These self-starting electric clocks include popular-priced models from alarm to kitchen and mantel clocks. Each model is well illustrated, and full description given.

Tork Clocks (629)

A new bulletin, announcing price reductions and additions to its line has been presented by The Tork Clock Co., Inc. Four Little-Giant models, self-starting synchronous, are listed, together with diagrams and cross-section illustrations. A new powerful P type motor, standard in time switches and wall clocks, is shown in full detail.

Classroom Lighting (630)

Recommendations for classroom lighting is a booklet that has been published by the Wakefield Brass Co. in which standards of modern classroom lighting are discussed and illustrations of proper installations given. "Room by Room Relighting" and "Lighting the New School" are typical chapters in this enlightening publication.

Traffic Safety (631)

"Seeing and Traffic Safety" is the subject of a new publication by General Electric, Nela Park Engineering Department. This 24-page booklet summarizes for both the individual citizen and the public official a five-year series of researches into the actual visual situations on streets and highway.

Capacitors (632)

Type FP dust-tight capacitors for use in industrial plants coming under the scope of NEC regulations for hazardous locations are presented in a new 10-page bulletin by Westinghouse. Contents of the publication include valuable hints on capacitor applications, description of construction features of units covered, complete dimensional data in the form of outline drawings and typical wiring diagrams for installations in various sections of feeder and motor circuits.

Luminaires (633)

A new four-page illustrated booklet describing a twin-lamp fluorescent, RLM-type luminaire, designed especially for general or supplementary lighting in low bay industrial areas, has been issued by Westinghouse. This fixture makes possible high-intensity glareless illumination without harsh shadows or annoying heat radiation. The booklet contains a complete written description of the fixture, including spread and cut-off values, and its operating power factors. How cyclic flicker, or stroboscopic effect is minimized, is simply explained. A series of pictures illustrates the ease of installing or inspecting the luminaire, and at the time shows construction features.

Calrod Units (634)

A complete story of the Calrod unit replacement program has been presented in a 16-page, two-color catalog by the Hotpoint Product Service Division. This book explains how old electric ranges of almost any make can be modernized by installing the new Calrod replacement units. It describes Hotpoint's extensive advertising and promotional plans as well as the replacement units themselves. Five pages are devoted to specifications, prices, and lists of old ranges, other than Hotpoint, on which Calrod units can be installed.

"Industry-Minded"

● The growth of the western electrical industry has been due in large measure to its "Industry-Minded" workers, the members of the Pacific Coast Electrical Association.

● You as a P.C.E.A. member can be proud of your part. Whether you personally attended the Oakland Convention or "carried on" at home, YOUR cooperation has helped the forward growth of the Industry in the West.

JOSLYN COMPANY
OF CALIFORNIA

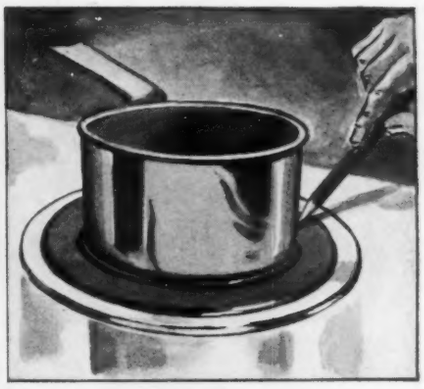
FACTORY: 5100 DISTRICT BOULEVARD
LOS ANGELES

DISTRICT OFFICE: 180 POTRERO AVE.
SAN FRANCISCO

SO I PICKED THE RANGE WITH CHROMALOX UNITS

1. I was out for the best in electric ranges but I hadn't found the one I wanted until . . .

2. I saw one with a range unit that cooks with individual "rings of heat". It was a CHROMALOX unit.



3. This unit has selective cooking areas and I could see how this would save me money whenever I use small utensils.

4. Its all-flat top makes cleaning easy—no underneath part requires any cleaning.

5. And, of course, the Chromalox unit has six heats, and gosh, how fast it heats up!

6. So I picked the range with Chromalox units and I've got the best in town.

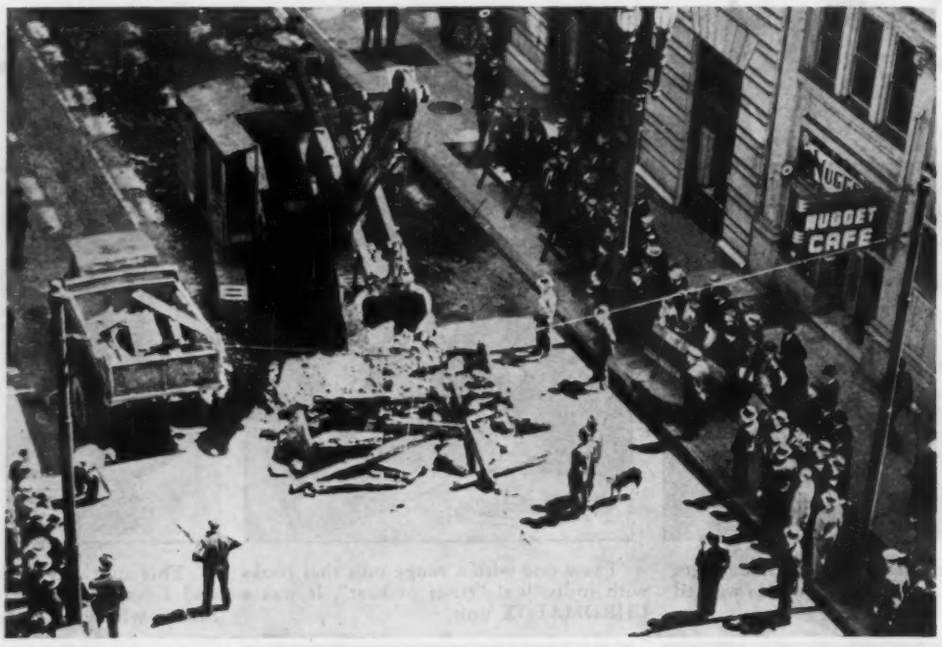
TAKE a tip from this young lady. Range buyers are looking for the best in ranges — and that includes the cooking unit, too. Be ready for the housewife who asks for the range unit with "selective cooking areas" or other popular Chromalox features. Use Chromalox Units for replacements too — they fit all ranges. Write for this new booklet — **"How to Sell More Electric Ranges"**. It's packed full of sales data and a wealth of material of general interest for every dealer. It's free on request.

Send for it today ➡

EDWIN L. WIEGAND COMPANY

7540 THOMAS BOULEVARD — PITTSBURGH, PA.

Write us or our nearest representative — MONTGOMERY BROTHERS — 911 Western Ave., Seattle, Wash. 1501 N. W. Kearny St., Portland Ore. • 61 Fremont St., San Francisco, Cal. • 420 S. San Pedro St., Los Angeles, Cal. • THE PETERSON COMPANY — 1921 Blake Street, Denver, Colo.



Are YOU a "Sidewalk Superintendent?"

Are you content to stay on the sidelines and "hope" that the Northwest electrical industry maintains its rate of growth —that the increase in the use of electrical power continues? Are you satisfied to "look on" and wish for this in order that your own job or business will expand?

Or should you get in the "driver's seat" and help the industry grow in a manner that will advance your own interests?

The Northwest Electric Light and Power Association aims at the development of your industry, your job, and your community in Washington, Oregon, Utah, Montana, Idaho and British Columbia. It has served you since 1908 in numberless ways, no matter what your line of electrical business or your specialized work in the industry may be. Today it is more virile than ever—20% increase in membership in the past 12 months.

Membership in the Association will take you out of the "Sidewalk Superintendent" class and make you a part of the movement that has placed the Northwest in the forefront of electrical development in the United States. Membership also gives you each year 12 issues of Electrical West, packed with practical ideas and latest electrical news.

Let us tell you how easy it is to join—and how little it costs.

NORTHWEST ELECTRIC LIGHT and POWER ASSOCIATION

707 SPALDING BUILDING **PORTLAND, OREGON**

See your way to new profits via FLUORESCENT light

...Get the story Complete from your Graybar lighting specialist

Right now, buyers everywhere are highly receptive to the idea of lighting modernization using the new fluorescent lamps. Profitable equipment sales and installation contracts are waiting for the man who *knows the whole story* on fluorescents. For sales to stores, offices and industrial plants particularly, you'll need all the facts — all the "do's-and-don'ts," and an up-to-the-minute picture of the reflectors and accessories currently available.

Why waste working time trying to "pick up" the story on fluorescents by piecemeal inquiry from conflicting sources? To see your way clear to fluorescent profits, call on your local GRAYBAR lighting specialist. You'll have a full range of the newest, soundest items to choose from, all backed by the satisfaction-insurance of the GRAYBAR Tag. Or write direct for information, mentioning type of application.

GENERAL ELECTRIC FLUORESCENT LAMPS

18-inch (15 watts); 24-inch (20 watts); 36-inch (30 watts); 48-inch (40 watts). In white, "daylight," and a wide range of colors for special purposes.

FLUORESCENT REFLECTORS

For Stores, Offices, Industrial Plants including Benjamin *"Streamliter,"* Wheeler *"Vapor-Proof,"* Curtis *"Curtistrip,"* Daybrite *"Commercial"* and other profit-making items.

AUXILIARIES AND SUPPLIES

A full line of approved equipment, including lampholders, starter switches, ballast transformers, and wiring supplies particularly adaptable to modern lighting installations.

"Everything Electrical"

GRAYBAR offers 60,000 items . . . everything electrical . . . the outstanding lines of merchandise and supplies from 200 leading manufacturers. Prompt shipment from 82 warehouses, coast-to-coast.

GraybaR
HEADQUARTERS for FLUORESCENT LAMPS—ACCESSORIES—REFLECTORS

GraybaR QUALITY SINCE 1869 *Everything Electrical* GraybaR ELECTRIC COMPANY

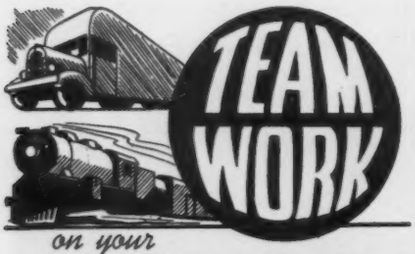
"With the information I got from GRAYBAR, I was able to get enough fluorescent business to become the 'fluorescent specialist' in this town."

—says Contractor R———— J————

(No. 9 of a series of 10-second "quotes" from typical Graybar customers.)

OFFICES IN 82 PRINCIPAL CITIES

EXECUTIVE OFFICES: GRAYBAR BUILDING, NEW YORK, N. Y.



on your

FAST FREIGHT From the East

A Pacific buyer specifies NATIONAL on a rush shipment from the East.

Next day the shipment is picked up at the Eastern source.

Consolidated into a NATIONAL daily "through" car, it leaves promptly for the Coast.

Delivered on time to the customer's door! Let NATIONAL "Teamwork" save you time and money. Rates on request.

NATIONAL CARLOADING CORP.

Offices and Agents in All Principal Cities.

Oil Circuit Breakers (635)

An eight-page leaflet describing Type F-75 indoor, oil-circuit breakers with interrupting capacities of 75,000 kva., and designed especially for use in generating stations and industrial plants where minimum space is available for switching equipment, has been published by Westinghouse. This bulletin gives a general picture of the vast improvements that have been made in this type circuit breaker over previous types, and includes pointers on application, and installation. Distinctive features are listed and described. The back of the leaflet contains application tables including current, voltage and interrupting capacity ratings along with tables of weights and oil capacities.

Monel (636)

"Seven Minutes with Seven Metals" is the title of a 16-page folder in two colors issued by the International Nickel Co., Inc. This family of rustproof metals, including Monel, Nickel, castings, and the various types of other Monels are ably described. Mechanical properties, physical constants, products and forms available are included in this informative piece of literature.

Wire Equipment (637)

Wire stripping equipment is fully described and presented in a new four-page folder issued by The Ideal Commutator Dresser Co. Brush, vertical brush, cable, rotary-type wire stripper units are shown and various kinds of cutters. Wire nuts are also included.

Insulators (638)

"A Plan which Simplifies the Selection of O-B Switch and Bus Insulators" is the subject of a 28-page bulletin just published by the Ohio Brass Co. This booklet tells how to judge station posts, describes design features, presents four pages of useful handbook data, and gives complete catalog information on O-B's conventional insulators of the pine and cap type and those of the post type. A feature of this booklet is a 2-page panorama of all unit-type insulators which is followed by detailed information on individual units, an arrangement that simplifies the selection procedure.

Resistors (639)

Resistors and rheostats are the subject of a new Hardwick and Hindle, Inc., 12-page catalog. Vitreous-enameled rheostats, adjustable resistors and numerous other types of resistors and reactors are covered in this attractive publication. Each unit is illustrated and completely described.

Transformers (640)

A new 16-page bulletin describing a complete line of dry-type transformers, auto-transformers, boosters, and phase-changing transformers for applications where small kva. sizes are required, and where space limitations and insurance regulations prohibit the use of oil insulated apparatus, has been published by Westinghouse.

Bull Dog Catalog (641)

New spring catalog of the Bull Dog Electric Products Co. has just been issued. This 80-page publication covers a multitude of Bull Dog products ranging from safety switches to circuit breakers and miscellaneous devices. Complete information is given about each particular unit, together with illustrations, tables, diagrams and dimensions.

Penn-Union Catalog (642)

Penn-Union Electric Corp. has published its 1940 catalog on electrical conductor fittings and devices. The catalog is loose leaf, indexed, with a pictorial description of the complete line group in front.

SAVE TIME! USE THIS COUPON

To keep posted, simply circle the items in which you are interested, cut out the coupon (it can be pasted on the back of a postcard) and mail to:

ELECTRICAL WEST, 68 Post St., San Francisco, California
Please send me the following CIRCLED items:

601	602	603	604	605	606	607	608	609	610
611	612	613	614	615	616	617	618	619	620
621	622	623	624	625	626	627	628	629	630
631	632	633	634	635	636	637	638	639	640
641	642								

Name ..... Title* .....

Company* .....

Address .....

* Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.

NEW BOOKS

METHODS OF MEASURING RADIO NOISE, 1940. report of the Joint Coordination Committee of EEI, NEMA and RMA. The report recommends: a meter for measuring the noise, ways to use the meter for: measurements on low and high voltage apparatus, on long overhead lines, and for determining broadcast field strength. It recommends procedures for collecting data in order to establish noise standards. Price to members and employees is 20c, to non-members in U.S., 50c.

"THE SIMPLEX MANUAL" by Simplex Wire and Cable Co., Cambridge, Mass. A handy pocket manual containing extensive tables and data for electrical engineers, contractors and wiremen relative to wires and cables of all characters and types beginning with sections devoted to cataloging and describing the uses and construction of each of its own wires and cables. The second part goes on to furnish extensive tables useful in calculating wiring installations. The book contains 350 pages of useful data.

Here's a low-cost way

to Increase Customer Satisfaction
Promote Load Growth
Reduce Revenue Losses

There's Profit in Voltage Regulation

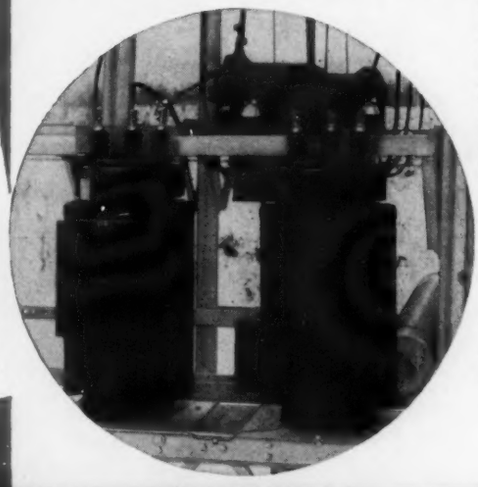
Case I Voltage levels and customer service on a 10-mile branch feeder of a southwestern utility were improved by installing two G-E induction regulators at a point four miles out on the line. Rebuilding of the line was avoided, *at a saving of $1,600.*

Case II A midwestern power company was able to bring well-regulated power to a remote village at low cost through the use of two G-E induction regulators. Instead of constructing a 13,800-volt line, a 6900-volt line was used with the two regulators—*at a saving of $2,000.*

BECAUSE of the economy and flexibility features of the improved G-E induction regulators, accurate voltage regulation can now be economically justified on practically every one of your distribution feeders.

The lower initial cost of these regulators saves you from 10 to 12 per cent over previous designs. Flexibility of application permits easy, time-saving installations *either indoors or out.* Reduced space requirements, simplified inspections, and lowered maintenance costs are added benefits—and the prevention of kw-hr revenue losses through improved voltage conditions, satisfied customers, and consequent load growth make it possible for these regulators to actually ***pay their own way.***

Your electric service is judged by the voltage you deliver at your customer's service entrance—and smoothly regulated "straight-line" voltage is the shortest path to customer satisfaction. It will pay you to get complete information on these improved G-E regulators. Ask your nearest G-E representative for Bulletins GEA-2985A and GEA-2018D, or write to General Electric, Schenectady, N. Y.



Two G-E Type BIRS indoor-outdoor induction voltage regulators installed outside a substation

GENERAL ELECTRIC

404-2

SERVICE *from*

WESTINGHOUSE FACILITIES

Your nearest Westinghouse office, distributor or service center will give you fast action on any electrical requirement.

MAJOR OFFICES

LOS ANGELES, 420 So. San Pedro St.
PORTLAND, 309 S. W. Sixth Ave.
SALT LAKE CITY, 10 West First South St.
SAN FRANCISCO, 1 Montgomery St.
SEATTLE, 603 Stewart St.

BRANCH OFFICES

BAKERSFIELD, 2224 San Emedio St.
BUTTE, 129 West Park St.
EL PASO, Oregon & Mills Sts.
FRESNO, 872 Peralta Way
PHOENIX, 11 West Jefferson St.
SACRAMENTO, 20th and R Sts.
SAN DIEGO, 861 6th Ave.
SPOKANE, 158 So. Monroe St.
TACOMA, 1023 A St.

SERVICE CENTERS

EMERYVILLE, 5915 Green St.
LOS ANGELES, 420 So. San Pedro St.
PORTLAND, 309 S. W. Sixth Ave.
SALT LAKE CITY, 10 West First South St.
SEATTLE, 3451 East Marginal Way

DISTRIBUTORS

BUTTE, 50 East Broadway
EL PASO, Mine & Smelter Supply Co.
LOS ANGELES, 905 East 2nd St.
OAKLAND, Tenth & Alice Sts.
PHOENIX, 315 West Jackson St.
PORTLAND, 134 N. W. Eighth Ave.
SACRAMENTO, 20th & R Sts.
SALT LAKE CITY, 235 West South Temple St.
SAN DIEGO, The Electric Supplies Distributing Co.
SAN FRANCISCO, 260 Fifth St.
SEATTLE, 558 First Ave., South.
SPOKANE, 152 So. Monroe St.
TACOMA, 115 A St.

Tune in "Musical Americana," N. B. C. Blue Network, every Thursday evening.

Westinghouse

border to border

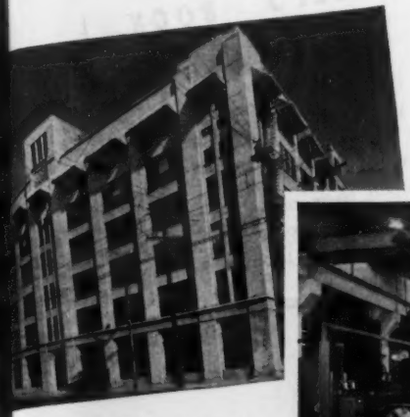
With major offices in 5 cities of the West, branch offices in 9 others, agent jobbers for both apparatus and merchandise in 13 conveniently located centers, Westinghouse provides unexcelled facilities to Western industry. And hundreds of Westinghouse dealers, from border to border, are ready to serve the general public with a complete line of Westinghouse appliances.

This organization is available to power companies and their customers. It is staffed with competent engineers who are at your service. Ample stocks of standard items are carried, to give you prompt deliveries. And—complete service facilities, with modern, well-equipped shops and skilled craftsmen, are ready to take care of your maintenance work.

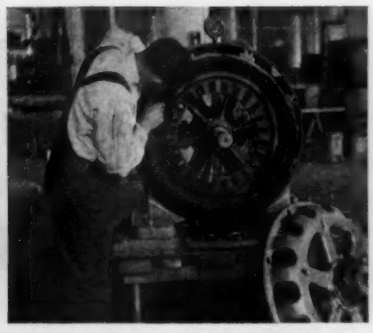
These Westinghouse people of the West—nearly 2000 of them—are at your command, for any electrical requirement. Just call the nearest office.

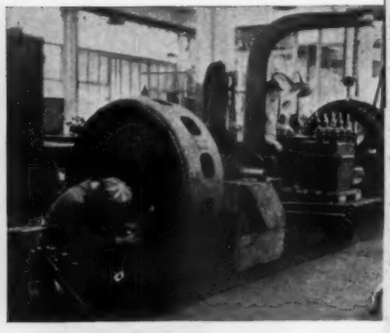
WESTINGHOUSE ELECTRIC & MANUFACTURING CO.

J-97012



Complete facilities for Southern California are available from the Westinghouse Building in Los Angeles.





Service shops at Los Angeles (left), Emeryville, (center) and Seattle (right) are ready day and night for maintenance work.

Office and factory at Emeryville, where is located the largest plant west of the Mississippi manufacturing a complete line of porcelain insulators.

Again in 1940, Westinghouse is represented at the Golden Gate International Exposition.

SERVES THE WEST

W
WESTINGHOUSE ELECTRIC

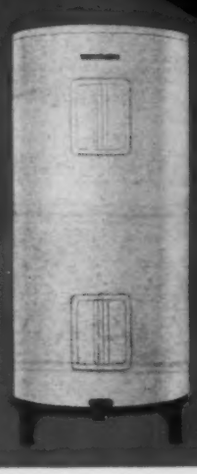
Every house needs
Westinghouse

HERE'S ONE REASON
***WESTINGHOUSE Water Heaters**
SELL EASIER!

NEW, DIFFERENT "HOT WATER HELPS" BOOK PAVES WAY FOR SALES!

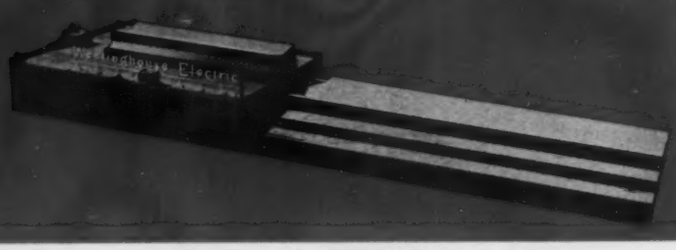
Selling is *easier, quicker, more profitable* when your prospect is presold before you call.

The "Hot Water Helps" Book does just that for you. See below why women read it from cover to cover—and unconsciously open their minds to your selling story. See how this new kind of selling tool puts you in line for extra water heater profits!



***MADE IN THE WEST!**

Shown at the right is the Westinghouse Plant at Emeryville, California. Here, Westinghouse Electric Water Heaters are built by West Coast people for quick delivery to dealers west of the Rockies.



TRY THIS *New* APPROACH TO EXTRA PROFITS

Every woman wants to be more beautiful. Every woman looks for easier ways to keep her home neat and attractive.

The "Hot Water Helps" Book gives your prospect what she wants—beauty and health hints, short cuts to easier dishwashing, laundering, house cleaning, cooking. It is practical, authentic, prepared with the help of famous women's magazines.

And every helpful suggestion sells the need for plenty of 140° HOT water! That's why your prospect is *easier to close* when you show her how economically a Westinghouse will give her the 140° HOT water she needs!

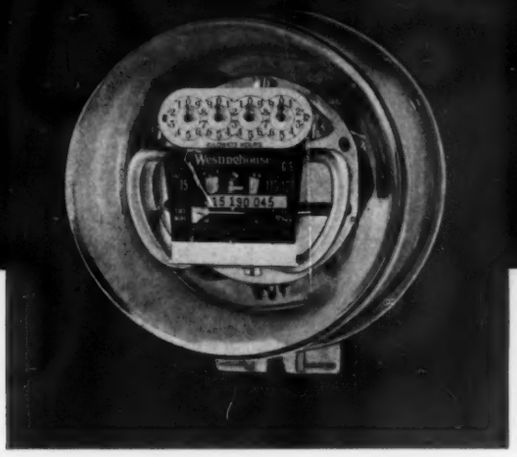
It's a *new approach* to water heater selling, built into a plan that's ready to boost profits for you beginning right now. Get details from your distributor, or write Westinghouse Electric & Mfg. Co., Merchandise Division, Mansfield, Ohio. Dept. 174.

TUNE IN "MUSICAL AMERICANA" EVERY THURSDAY EVENING, N. B. C. BLUE NETWORK

Westinghouse *Home-proved* Water Heaters
"The Line of Least Resistance"

STAYS PUT

because it's One Piece



ONE-PIECE ELECTROMAGNET GIVES WESTINGHOUSE METERS LONG-TIME ACCURACY

The laminations of the electromagnet are stamped—in one piece—and riveted together, to form a one-piece, rigid core that *stays just that way.*

PERFORMANCE CHARACTERISTICS ARE PERMANENT

There can be no shifting of alignment that might alter the meter's accuracy because the power factor and light load adjustments are built into the assembly, its calibration is maintained even when the meter is dismantled. This electromagnet *stays put.* It costs us more to build, but it costs you less to use.

ONLY WESTINGHOUSE METERS COMBINE ALL THESE FEATURES

1. Lifetime Ball and Jewel Bearings — no lubrication, no periodic adjustments or replacements.
2. Gold Finished Register — no corrosion to cause friction.
3. One-piece Electromagnet — fixed performance characteristics.
4. No Mechanical Adjustments — permanent, long-time accuracy assured.

Call your Westinghouse office or address Westinghouse Electric & Manufacturing Company, Dept. 7-N, East Pittsburgh, Pa.

J-40262

Westinghouse Meters

R.I.P. NEWS

NEW IOWA 22 KV. LINE R-I-P PROTECTED

Engineer Harry Everts of the Fort Dodge, Des Moines and Southern Railway recently handed Westinghouse R-I-P's the exclusive insulator job on his company's new 22 kv. line. Reasons: in his opinion one of the best insulators on the market . . . plus future protection against insulator-generated interference to radio reception, based on previous results with R-I-P installations.

RADIO COMPLAINTS IN FLORIDA SILENCED

In Florida, R-I-P quieted a troublesome radio interference sector. Results were so excellent, utility has now standardized on R-I-P porcelain for their 13 kv. lines.

Similar results to these are reasons why operating companies, with one-third the total U. S. generating capacity, have approved and installed R-I-P insulators in one short year.

J-05111

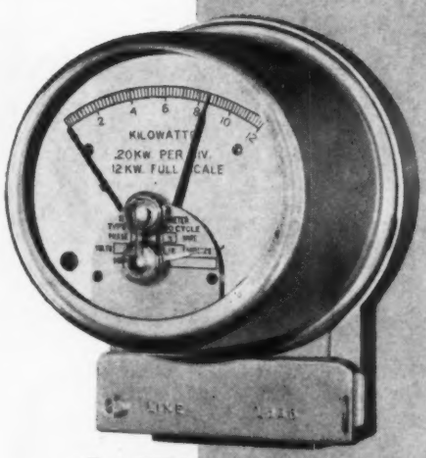
THIS FEATURE HAS WON INDUSTRY'S APPROVAL

The patented metallic glaze on Westinghouse R-I-P insulators permanently eliminates radio interference at the insulator. For your insulator noise problems, specify R-I-P Porcelain as the most efficient and economical answer. For fuller details, write Westinghouse Electric & Manufacturing Company, Dept. 7-N, East Pittsburgh, Pa.

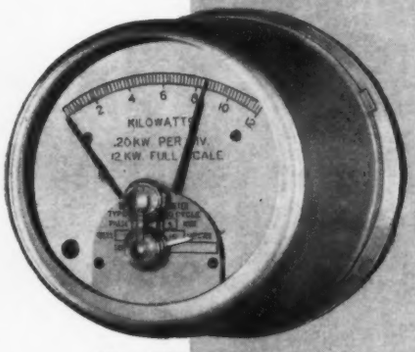
Westinghouse Porcelain

W WESTINGHOUSE ELECTRIC

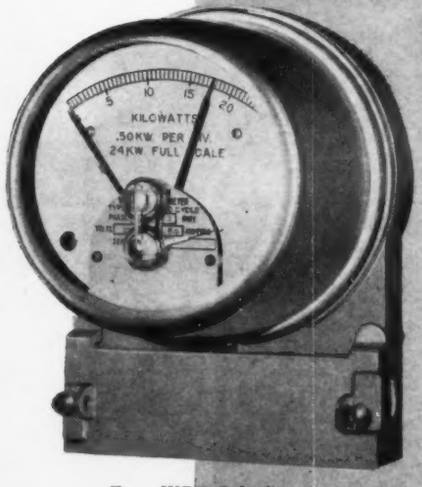
MAINTENANCE IS MINIMIZED WITH Lincoln MAXIMUM DEMAND METERS



Type WDA Singlephase and Two-Element, 3 Wire

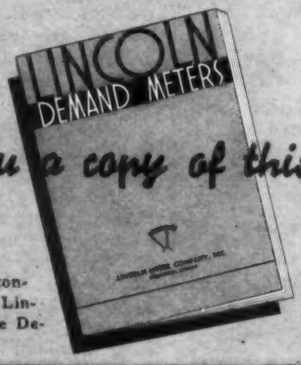


Type WDS Singlephase and Polyphase



Type WDP Polyphase

WITH Lincoln Maximum Demand Meters, the effort and cost of demand meter maintenance is at an absolute minimum. This is primarily due to the thermal principle by which these meters operate. Since these meters are merely deflection type instruments, but highly time-lagged, and because there are no timing mechanisms involving motors, springs, or gears, there is practically nothing to wear—assuring sustained accuracy and long, trouble-free life. Operating independently of the watt-hour meter, and available in a complete line of indicating and graphic instruments, Lincoln Meters are easily adaptable to any demand application where accurate, maintenance-free measurement is required.



Have You a copy of this Bulletin?

It describes the design, construction and operation of Lincoln Watt Demand, Ampere Demand, and Graphic Demand Meters, complete with instructions and price list. . . .

LINCOLN METER DIVISION
SANGAMO ELECTRIC COMPANY SPRINGFIELD ILLINOIS

Preferred *because they are* **Dependable**

The leading utility companies and "industrials" use PENN-UNION fittings to make certain of *dependable* connections.

They know that *every* Penn-Union fitting is carefully designed and manufactured . . . thoroughly tested.

Standard and special types, for every need.

Straight and angle. For tube and cable.

All types; tubing or cable, or flat bar.

These fittings are high conductivity copper alloy, with machined contact surfaces.

More than 6,200 items in the Penn-Union line . . . for every type of electrical connection . . . including many NEW and IMPROVED fittings. Write for Catalog.

NICHOLAS & COOK
1063 HOWARD STREET
SAN FRANCISCO

J. W. WATKINS
538 SKINNER BLDG.
SEATTLE

PENN-UNION ELECTRIC CORP., Erie, Pa.

You'll find it in the *complete* line

PENN-UNION
Conductor Fittings

A NEW EDITION of "Artifical Light and its Application," an up-to-date source book written by experts, has just been published by the Westinghouse Lamp Division. Simple, clear and comprehensive, this survey of latest lighting practice is presented in terms of interest to lighting engineers, students, and laymen. Over 400 photographs, sketches, line drawings, pictorial tables and graphs are used to illustrate recent developments in fluorescent, electrical discharge and incandescent lamps. An unusual feature of the 296-page publication, which costs $1.25 postage prepaid, is that individual chapters may be purchased at 7c each. There are 21 chapter heads. Bound in a durable gray and dark-blue cover with a spiral binding, this book may be obtained from the Advertising & Sales Promotion Dept., Westinghouse Lamp Division Westinghouse Electric & Mfg. Co., 150 Broadway, New York City, N. Y.

DESIGN OF ELECTRICAL APPARATUS, by John H. Kuhlmann, published by John Wiley and Sons, $5.00. Being a new edition of a volume first published in 1930, this alters certain sections to conform to today's practices. As to both the first and second editions, the treatment consists of discussions of the equipment to be designed, elaboration of design principles. The second edition includes a revision of the section on direct current machine design, and adds: (1) synchronous-machine calculations by the two-reaction method; (2) analytical methods for polyphase motor design; (3) complete sample designs for new types of motors.

SAFETY RULES for installation and maintenance of electric utilization equipment are now available in printed form in Handbook H33, sold by the Supt. of Documents, Government Printing Office, Washington, D. C., at 15c each. It consists of part 3 of the National Electrical Safety Code dealing with utilization equipment and the grounding rules contained in section 9.

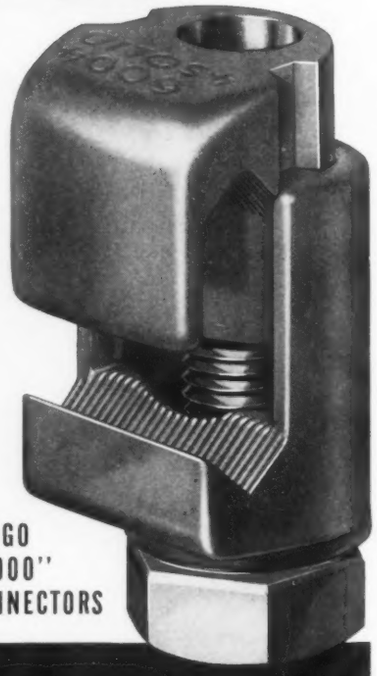
The detailed rules deal with conductors and protective devices used in the interior wiring of buildings and also with control equipment, including switchboards and panel boards.

ELECTRICAL METERMEN'S HANDBOOK, fifth edition, published by Edison Electric Institute. In the preface to the fifth edition, the handbook revision committee has the following to say:

"The present handbook, as were the earlier editions, has been prepared primarily for the practical meterman and the meter engineer confronted with the day-to-day problems of metering customer loads. It represents, however, a rewrite and rearrangement of the material appearing in the earlier editions. The theoretical material has been condensed, descriptive material of older types of meters, and of direct-current meters, has been eliminated as being of limited usefulness today, and available in the company libraries when required. A new format has been adopted to more clearly show connection diagrams, and allow for more useable working tables of meter constants.

"The present book contains the basic principles of metering, diagrams of connections principally used for all types of metering, both for energy and for power, description of laboratory equipment and procedure, full description of all modern type meters of American manufacture and complete tables of constants for a.c. and d.c. meters covering all types, both old and new, which are in current use."

for repeat use



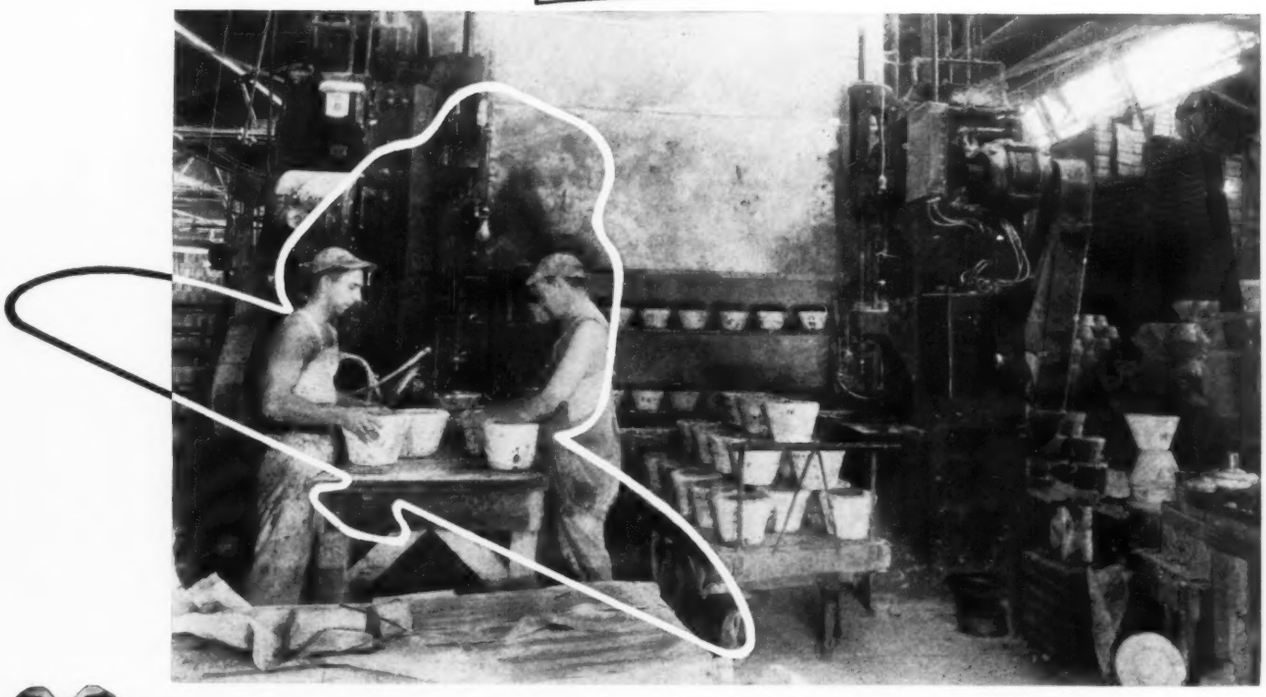
FARGO "6000" CONNECTORS

Distortion-proof Fargo "6000" Connectors retain their streamlined "figger" and bulldog grip under highest service pressures. They're built for repeat use . . . handle as easily, grip as firmly after years of service as the day you take them out of the carton. Specify Fargo "6000" in your next connector order, you'll use them over and over again. No. 6 and No. 4 now available; additional sizes at a later date.

MADE BY FARGO MFG. CO.
DISTRIBUTED BY
LINE MATERIAL CO.

ILLINOIS *Eliminates* INTERNAL STRESSES AND CRACKS IN PORCELAIN WITH HOT PRESS

Perfect PIN HOLES ALSO PRODUCED THROUGH THIS PROCESS



Your production schedules never suffer because of Illinois delivery —your order comes to you as promptly as you specify it — this modernly equipped organization is set up for speed as well as quality.

Send for latest CATALOG

The Illinois organization is fully equipped with modern machinery to insure balanced Insulators—high dielectric strength—high mechanical strength—exact dimensions.

One of the controlled steps in the manufacture of porcelain is that of forming the clay in plaster molds to size and shape. This comes immediately after the clay is compressed and extruded to size.

Extreme care is used in the Hot Press operations to eliminate folds in the clay so that no internal stresses or cracks occur. This step in porcelain production again emphasizes the reasons for Illinois quality.

Pin holes are made during the moulding process and this requires real skill for perfect results. The accuracy of Illinois pin holes is assured.

Standardize on

ILLINOIS

FOR TOP QUALITY AND EXACT DIMENSIONS——

ILLINOIS ELECTRIC PORCELAIN CO.
MACOMB, ILLINOIS

THE HENGER-SELTZER CO., LOS ANGELES, IS READY TO SERVE YOU

A statement

"FLUOR

BY THE PACIFIC GAS

PACIFIC GAS and ELECTRIC COMPANY regards the Mazda Fluorescent lamp as a discovery of immense value to the lighting industry—and to our customers!

Its decorative possibilities stagger the imagination. Already thousands of shops, bars, restaurants and similar places have used fluorecent colored lighting with delightful effect, and wherever they have wanted other colors to show up, they have found fluorescent "daylight" to be an almost perfect substitute for Old Sol.

In the realm of seeing light, fluorescent has many applications. In factories, for example, there are intricate operations, fine assembly, close inspection and other difficult visual tasks, all of which require a certain amount of "plus" lighting. For such purposes, fluorescent is ideal.

Even for general illumination in stores and office buildings, fluorescent has certain characteristics which sometimes recommend it over other light sources, and, parenthetically, we should add that in the re-lighting of old buildings, fluorescent ties in perfectly with the new money-saving "thin wall" wire—and vice versa!

Of course, fluorescent is not the answer to every lighting problem and those of us who want to see it really prosper will guard against its misuse.

about....

RESCENT"

& ELECTRIC COMPANY

Our further responsibility is to see that when fluorescent is used, the fixture which directs and controls the light is properly engineered.

Manufacturers of stock fixtures who are using gaseous sources with the idea of providing the best possible illumination are to be encouraged and supported. Likewise those firms which are selling direct to the user can expect our support if they will sell constructively.

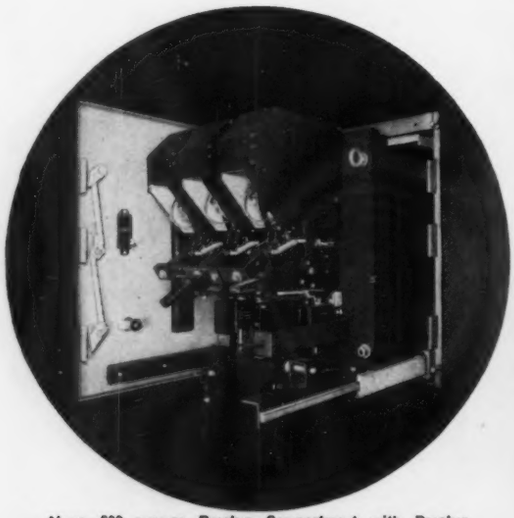
This means making a sincere effort to find the right light source for each individual job, whether it be fluorescent, incandescent, sodium vapor, or something else.

It means telling the customer the WHOLE story and fairly representing ALL the costs.

And it means selling BETTER ILLUMINATION first, last and always!

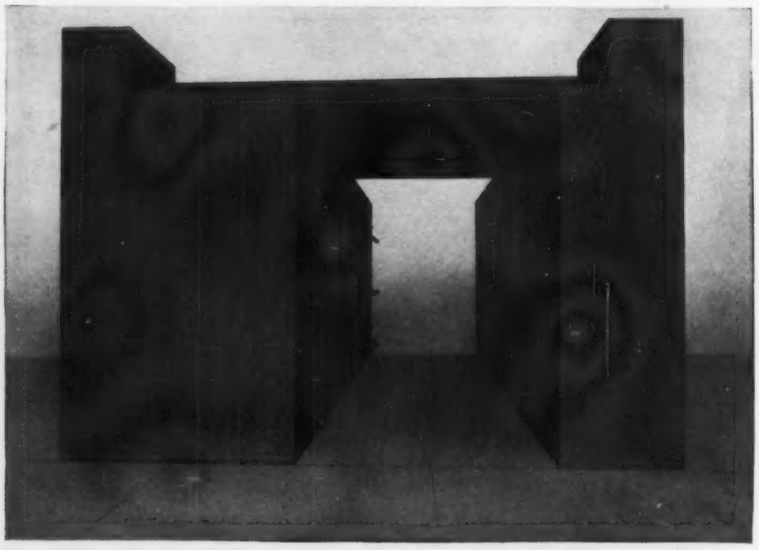
The opposite kind of merchandising—the kind that seeks to profit from mere change—will never receive our support. But the dealer who employs fluorescent when and where it will benefit THE CUSTOMER — that dealer will find us backing him one hundred percent!

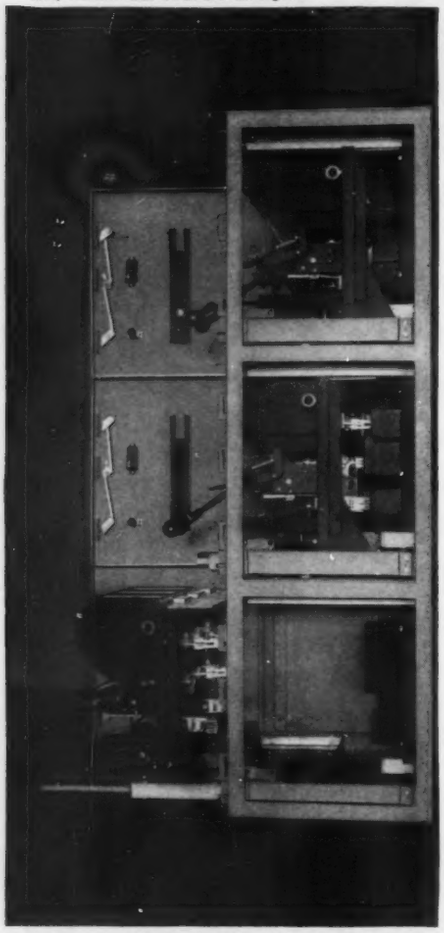
PACIFIC GAS and ELECTRIC COMPANY, 245 Market Street, San Francisco



Above—600 ampere Breaker Compartment with Breaker and Telescoping Rail fully Withdrawn.

Right—460 volt Drawout-Type Air Circuit Breaker Switchboard for protecting and controlling station auxiliaries in a prominent mid-western utility. Breaker structure on left; transfer bus structure on right.





End view of switchboard with plate removed showing breaker compartments. Breaker in top compartment is in OPERATING position; breaker in middle is in TEST position; while lower compartment shows breaker in DISCONNECTED position.

RUN IT IN...ROLL IT OUT

LIKE A FILE DRAWER

Telescoping rails in *each* compartment permit READY INSERTION — QUICK REMOVAL with the NEW Roller-Smith drawout type air circuit breaker switchboards.

Open and close the drawer of any modern steel filing cabinet. Easy, isn't it? Well, it's almost as easy to insert or remove a unit in R-S drawout-type air circuit breaker switchboards.

For into each compartment are built Telescoping rails, which operate on the same principle as a file cabinet. There are no separate rail extensions to put in place. Every unit may be entirely withdrawn or placed in test position at the same time. Breakers can be withdrawn without resorting to handling devices . . . with minimum effort . . . and with complete safety to both equipment and operator.

The sturdy, heavy-duty R-S breakers are of the time-proved inverted contact design, taking advantage of the "loop" effect of the magnetic circuit to produce greatest contact pressure when such pressure is needed most.

Before you purchase any drawout-type switchboards investigate the new Roller-Smith design. You'll find many features that will interest you.

Electrical Measuring and Protective Apparatus

ROLLER-SMITH COMPANY BETHLEHEM, PENNA.

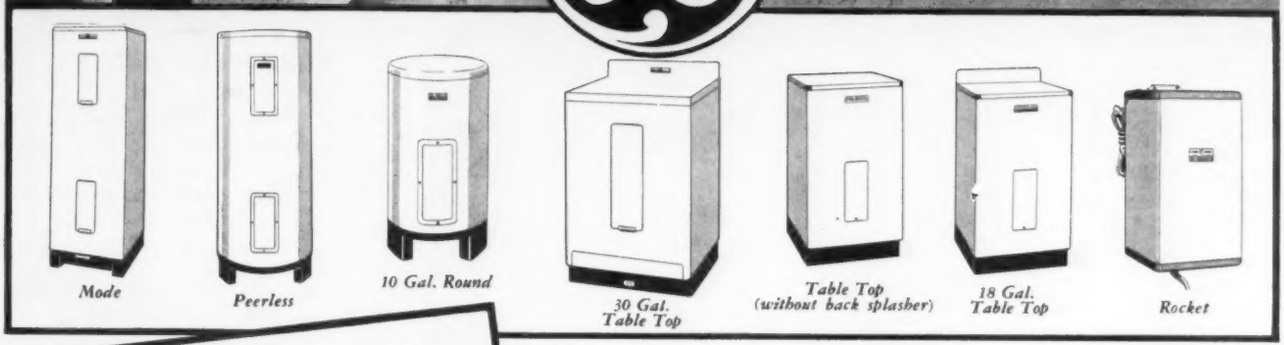
Switchboards • Metal Enclosed Switchgear • Electrical Instruments
Indoor and Outdoor Oil Circuit Breakers • Air Circuit Breakers

WESTERN REPRESENTATIVES

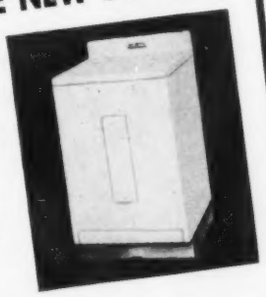
LOS ANGELES, CALIF.
Electric Material Co., 912 East Third St.

SAN FRANCISCO, CALIF.
Electric Material Co., 163 Second St.

SEATTLE, WASH.
Mr. J. C. McDougall, 500 First Ave., South



POPULAR NEW MODELS THAT PROMISE NEW BUSINESS



Model G-307

30 gal. capacity. Popular table-top design. Styled to match modern electric kitchen base cabinets and appliances.

Model G-101A

10 gal. capacity. Especially suited for commercial purposes as well as for small homes, auxiliary use, etc. Low-priced.

The great new line of General Electric Water Heaters is *complete*—with sizes and types for every requirement—from 2 to 140 gal. capacities—including popular-priced models for special promotions. And every G-E Water Heater has the famous CALROD *immersion type* heating unit, plus many outstanding features that SELL.

A new and complete array of sales promotion "props" and plans are ready to help you win new business. Call in your G-E Distributor today and look 'em over!

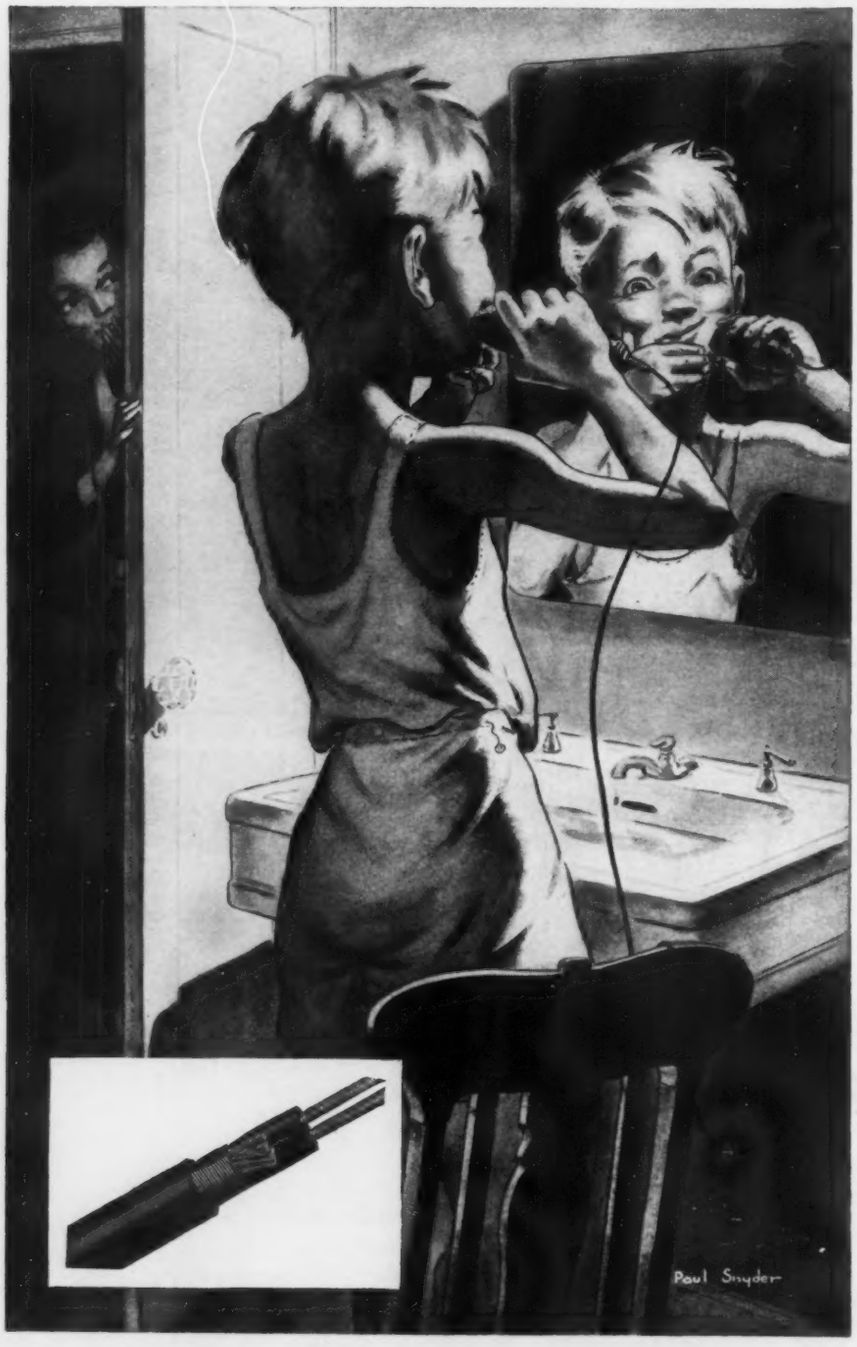
See This New and Utterly Different Water Heater Sales Manual!

Nothing else like it. Dozens of "how to sell" illustrations take the place of dry text matter. A complete sales course in "picture-book" form! Phone your G-E Distributor for a copy *now*.

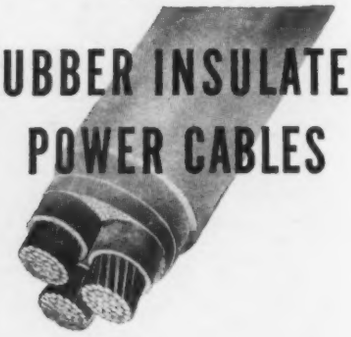
General Electric Co., Appliance & Mdse. Dept., Bridgeport, Conn.

GENERAL ELECTRIC

From Portable Cords to



RUBBER INSULATED POWER CABLES



OVER 60 TYPES OF ROEBLING (JR) ELECTRICAL WIRES AND CABLES

Rubber Covered Wires and Cables: Code; Performance; and Heat Resisting; Plain Rubber 60% sheath Power Cable and 40% and 60% sheath Flexible Cords

Power Cables: Paper; Cambric; Rubber

Parkway Cable, metallic and non-metallic

Service Entrance Cable

Slow-Burning Wires and Cable

Weatherproof Wires and Cable

Police-Fire Alarm Cable

Appliance Cords

Annunciator and Blasting Wire

Network Cables

Magnet Wire

Welding Cables

And a wide variety of other wires and cables; either Standard or to Customer's Specifications

QUICK SHIPMENT

Prompt Service is available at all offices and warehouse points listed below, where large stocks of a wide variety of standard Roebling Wires and Cables are always on hand. Your request for information, prices or samples will be welcomed.

JOHN A. ROEBLING'S SONS CO. OF CALIF.
San Francisco, Los Angeles, Seattle, Portland

IF IT'S ELECTRICAL WIRE OR CABLE **ROEBLING** I HAS IT!

THE WORLD'S FINEST FLUORESCENT LUMINAIRES

SKYLUX

PATENTS APPLIED FOR

STANDARD FIXTURES FOR *General Fluorescent Lighting*

ENGINEERED FOR HIGHEST EFFICIENCY

Here are a few of the reasons why SkyLux tops the field in fluorescent lighting: 1. More light on the working plane for the number of lamps used. 2. Installation can be made from present outlets as a single fixture or in long lines of light, either flush with ceiling or suspended from hangers. 3. Single fixtures can be easily converted at any time into continuous lines of light without expense of replacing original equipment. 4. Where lighting equipment budgets are limited, the "add-a-unit" feature makes your selling easier because intensities can be raised as needed by simply adding additional SkyLux fixtures. • It will pay you to recommend and install SkyLux both from your profit standpoint and the consumer's satisfaction. • Write today for the SkyLux catalog and learn all the facts about the world's finest fluorescent luminaires.

PATENTS APPLIED FOR

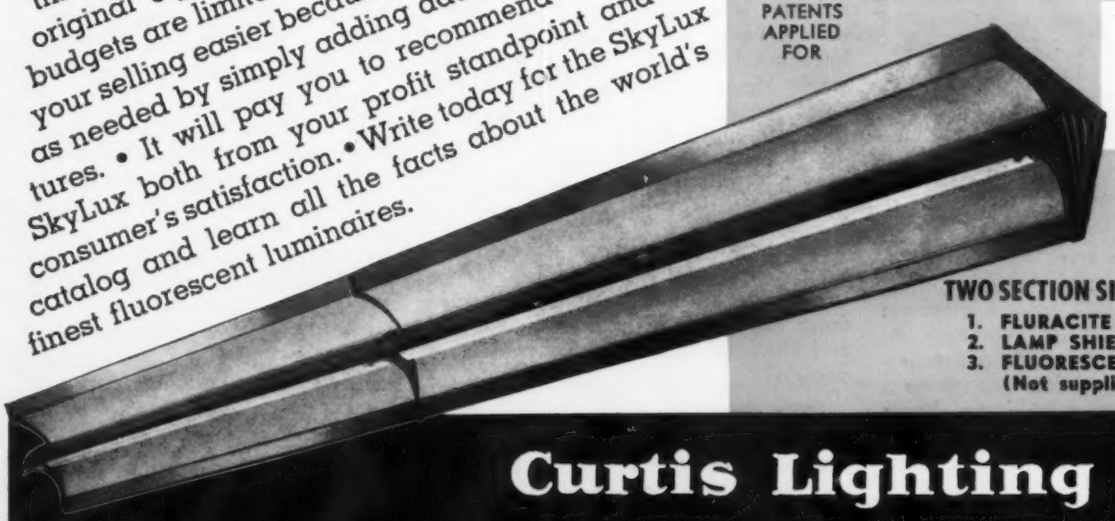
TWO SECTION TWIN SKYLUX

1. FLURACITE REFLECTOR
2. LAMP SHIELD
3. FLUORESCENT LAMP (Not supplied)

SkyLux HAS SHIELDED LAMPS

SkyLux Fluorescent Luminaires not only bear the Fluer-o-Lier official label but meet this all important specification laid down by the Fluer-o-Lier Manufacturers . . . *"Fluorescent lighting fixtures employing existing types of lamps are not recommended for schools, offices and similar locations unless lamps are shielded from direct view."*

PATENTS APPLIED FOR



TWO SECTION SINGLE SKYLUX

1. FLURACITE REFLECTOR
2. LAMP SHIELD
3. FLUORESCENT LAMP (Not supplied)

Curtis Lighting

NEW YORK 1123 West Jackson Blvd. • CHICAGO TORONTO

ELECTRA'S HUSBAND

College Reds

"JOE BROWN'S plenty worried, he tells me," I confided to Electra the other night. "His daughter is going around with the college red hots, and she comes home with ideas."

"What sort of ideas?" piped Electra. "Is that any worse than going around with some of your fraternity brothers and getting some of their ideas? I wonder which would contribute to her delinquency the most?"

Electra was being difficult, you see. I had to get this train of thought back on the right menace.

"The ideas she comes home with now are anti-social. You'll have to admit that ours were sociable. But you are dodging the issue again. Brown used to be a little pink himself, so he knows the symptoms."

"Oh, a reformed drunkard, eh? I hear they are the worst reformers. Didn't he turn out all right? After all it's just a phase of youth," said Electra, who has studied these things. "You know that every kid has to break away from his mother's apron strings. In breaking away he is apt to swing out too far, and try to question everything his parents stand for. It depends a lot too on how much personal antagonism the boy may have stored up against his father or mother. Sometimes his protest against the social order is really a left handed poke at his parents."

"That may be true," I countered, "but they are pretty capable, these youngsters. They talk from a platform like a veteran politician. They have assurance and skill and make a fine impression. Then when they get up on a soap box to expound a lot of theory that they've plucked from a book or have heard from an equally inexperienced and theoretical prof in economics, social science or political science—I shudder at the debauchery of that word 'science' as applied to this inexact mess of guess and gosh—they make a great impression on the Okies and the unskilled and unlearned. And they do a lot of damage.

"The guff they expound sounds so good and they talk it so enthusiastically that it sinks in deep. It is going to take years to erase the false impressions they create because the real facts are so dull by comparison. And nobody is ever popular telling folks that something they want to believe isn't so.

"What I object to most is that these boys are not getting any balancing influence, any teaching or counseling, evidently that brings them penetration into these social studies. They aren't learning any of the realities that would show them why their theories won't work."

"And why not?" asked Electra. "I think some of them rather pretty myself."

"Why not! Chiefly because we would need to develop a new race of human beings, a race not sprinkled with individuals who have an over-developed hunger for power, or just plain greed; with no slickers or fast workers, people without the gambling instinct, or that of the hunter, none of the predatory traits that keep us all in a turmoil now."

"It would be rather dull, don't you think?"

"I'm afraid so. Why there wouldn't even be any agitators, for after all, the agitator is only trying to phenagle a deal by which to get from those who have something already that which he wants himself, without the trouble to create it or work for it. He talks a lot about 'fighting for it' but he usually thinks of the rabble he arouses doing the fighting while he directs operations."

"Why don't you business men tell these youngsters, then? Why don't yuo explain all this that you have learned from experience so that both the prof and the student will understand it as you do?"

"But we don't have many business men capable of talking effectively. There's something about being a success as an executive and an administrator that takes action, not words. Few business men are articulate. Probably too busy making a success of their work instead of talking about it."

"Now here's your chance," said Electra with that look in her eye. "All that these youngsters need is a job. That will start to sober them up, give them a chance to marry the girl, and she and nature will finish the job."

"Yes, that's true," I thought aloud. "But many business men are afraid of these kids who have been spouting radicalism. They are afraid they'll stir up all the help. What could they do? What sort of a job could you give them?"

"You men *are* dumb, aren't you? Didn't you say you needed someone to tell your story to the world, and didn't you admit awhile ago that these youngsters are skillful talkers and explainers? Can't you put two and two together and get four times as far as you are now?"

"You mean hire them to study industry and business and translate it into American and tell the public? Say—"

"There, don't I always say that you are a smart person, dear? That's a *wonderful* idea, really."

FIXTURES are stuff that Electra says are called lighting because what you get out of them isn't. And so when I told her of the plight of the fixture men she snorted unbecomingly. I told her of the group of them called together in a meeting the other night. As they went in to sit down, one said to the speaker that he'd lost on a bid for a batch of new small homes. His bid was $6.50.

"Six fifty?" the speaker asked, "You mean per fixture."

"No, I mean per house," said the fixture man. "The so-and-so cut me to $4.50."

Later it came out that in a project of 600 new small homes not a single living or bedroom had a ceiling outlet in it. Lighting was to be done from floor lamps and pin-ups.

Fixture business was shot to hell, everybody admitted. Nobody could make any money in them anymore. Yet somebody spread out a big full page ad of a department store announcing the starting of a lighting fixture department. Cheapest advertised were for $7.49, and they ran up to $49.95. Lowest advertised price therefore was more than what these poor fixture men had bid for a whole house.

Real irony of the evening came walking in when the speaker started. His subject was the lighting market. And to illustrate the hunger of customers for good lighting he demonstrated a whole kitful of the lighting adaptors by which the mistakes of the fixture industry in the past have to be corrected.

At VICTOR — it's the Utilities that keep MEN AT WORK

As the Victor "clan" enters its sixth year we look back with some pride on a record of accomplishment. Just that many years ago a small group of specialists who believed that the Electrical Industry was still a frontier market organized this concern, and devoted their energies to designing and manufacturing an honest product—GOOD Insulators.*

Confidence in our own abilities and in the industry we serve has been fully justified.

Today finds us holding all of our old friends and constantly making new ones, both here and abroad. . . . Finds us also carefully guarding a reputation for furnishing the utilities and apparatus manufacturers with the finest high-voltage porcelain obtainable.

* *Makers of* **GOOD** *Insulators*

V

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Type HEX
Transformers

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BUSHING POCKET:—One-piece copper-bearing steel bushing pocket electrically welded to the tank provides protection to the high-voltage bushings.

COORDINATED BUSHINGS:—The insulation level of the bushings and windings are so coordinated as to cause abnormal line surges to flash over the bushings on the outside of the tank.

WEATHERPROOF TANK:—Electrically welded, copper-bearing sheet steel tank gives protection against rough handling and usage. Sand blasted both inside and out and carefully painted with three coats of weatherproof paint. Each coat of paint is of a different color and is carefully baked before the next coat is applied.

WINDINGS:—Windings are carefully treated to give added mechanical strength and protection to the coils, facilitate the dissipation of heat and strengthen the insulation. All windings have reinforced end-turn insulation.

CORE:—Core is made of the highest grade of non-aging silicon steel laminations that have been carefully sheared with the grain and then electrically annealed in order to obtain minimum core loss.

Wagner Type HEX distribution transformers, like all Wagner transformers, are built to give efficient, dependable, uninterrupted service. The HEX transformer is new in design, but it has back of it nearly fifty years of transformer engineering and manufacturing experience. This wealth of experience is reflected in the performance of Wagner HEX transformers. Their high efficiency and remarkable stamina is the result of constant improvement in design and construction.

Wagner experience is not limited to one type of transformer. Wagner manufactures a complete line of distribution transformers—single or three phase, rural-line and air-cooled. Also power transformers in all sizes and voltages.

A factory-trained sales engineer will be glad to work with you on any of your transformer needs. In the meantime write for bulletins TU-180 (Distribution) and TU-181 (Power) describing Wagner transformers.

T40

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TRANSFORMERS • MOTORS • FANS • BRAKES

The Industry Accepts the Challenge

PRESSURES of the Federal government, in the name of the people, are being placed upon the electrical industry, as well as on all American business. In broad aspect, these pressures may be likened to a challenge to private industry to prove that its ways of serving the public are best. While no direct threat has been voiced, the direction and implication of these pressures say in effect—"If you can't do the job the way the public wants it done, we'll have to take over and do it our way."

Not alone are the utilities in this predicament. The sales front of the whole industry is asked to prove that its methods of distribution are not wasteful and costly, that cooperative or mass chain organizations are not better methods of distributing abundant-life appliances and services than are distributors, wholesalers and dealers. The value and cost of advertising are challenged on the theory that elimination of this sales-building force would reduce prices to the consumer.

THE CONTRACTING branch is under direct persecutional pressure of anti-trust indictments and harassing investigations. Overall purpose of these is supposed to be that of reducing building costs so that lower income people may construct and own homes. Is this the real way to reduce building costs, or can the industry achieve them better by standardization, mass production and simplified practices? Can the contracting and wiring material groups meet these challenges?

As if engineering has not contributed enough despite the depression economy pressures, it is now asked to perform new miracles. With a minimum of money for capital expenditures the engineers are dared to prove their fitness by developing still higher efficiencies and better methods. They are challenged to engineer and build systems which will compete profitably with tax-free and federally-subsidized government systems.

AS FOR the utilities, government competition, regulation, taxes and public ownership agitation are not the only pressures. There are other forces, both external and internal that challenge managements. One is an aroused public opinion that superimposes a rate ceiling so low that net revenues are constantly threatened. The other pressure comes from beneath where efficiencies of new light sources, new appliances, new processes reduce the gross from which any net can be skimmed. Recourse from this dilemma lies in building new load that will assure both gross and net incomes.

What of the people in the industry, the individual men and women who look to it for their livelihood? These pressures rest upon them also. But entirely aside and apart from the implications of the serious problems that confront the industry as a whole as well as its various branches, there are other threats that affect them. There is the trend toward regimentation. And there is the threat of denial of personal liberties and individual initiative.

CAN and will the industry accept these challenges? Can it and its people prove that its ways—the traditional American ways—are equal to the test? Or must the system and the industry yield to increasing absorption into the State as one of the latter's functions on behalf of the people?

The industry IS equal to the test. For proof the editors submit the material in the following pages—the eighth annual Convention-in-Print.

THE INDIVIDUAL IN OUR INDUSTRY

By W. W. GLOSSER
President, PCEA

WHEN an industry affects the daily functioning of 22½ million homes, almost two million farms and four and a half million commercial and industrial establishments, the immediate assumption must be made that it is performing a useful, essential and worthwhile service. If it can be shown furthermore that this industry had increased its output almost forty per cent in the depression years since 1929 and that it had introduced innumerable new products and services in that interim, then it might be assumed also that it is a vital, progressive and resourceful industry, latent with opportunities and fully aware of its responsibilities. On the whole both of these assumptions apply to the electrical industry today. In fact they are not assumptions; they are self-evident truths.

Last year in these pages President Hitchener wrote on the theme that "Ours Is an Industry Latent with Opportunities." Those same opportunities exist today; in fact they have multiplied if anything. The whole industry appreciates their possibilities and is cashing in on them individually and collectively. However, there is one phase of the picture that merits some careful thought. In claiming these opportunities are we as an industry fully cognizant of the responsibilities that go with our stewardship? Collectively the answer is affirmative. Individually—well, I have my doubts.

Many years ago I worked for a railroad man who had a simple but forceful slogan—"If you can't work for the man you're working for, you had better quit." That same philosophy ought to apply to every individual in our industry today with relation to his particular job. It is safe to assume that none of us are in this business for our health or just for fun. We hope to earn a satisfactory livelihood, including reasonable security for our declining years. If this be our motive, then certainly we should be willing to assume the responsibilities that go with our job. As a matter of fact some of these are so vital that we *must* assume them if we expect our industry and our jobs to be preserved.

Perhaps the most basic individual responsibility is that we know our industry well enough to talk about it intelligently and then speak up at every opportunity, particularly when some one attacks it. We ought to know what this great business of ours means to each of us individually and what it means to the public. If we don't know, we should learn. Once we do know, we should never let an occasion pass without talking about some phase of it—our low rates, our new appliances and services, the share of the tax burden we carry, better lighting, adequate wiring, our new light sources, the economy and reliability of electric service or any one of a hundred different subjects. Such tactics seem to me to be just plain common sense. Without this kind of loyalty, knowledge, enthusiasm and optimism how is the public to learn that ours is a progressive, live industry?

Particularly when we hear critics attack or revile the industry, should we rally to its defense. For many years it was our singular misfortune to be the target for all manner of charges. Unfortunately in too many instances we took these attacks lying down. Today all business and industry is subject to criticism, political attack, over-regulation, and public suspicion. This is largely the result of propaganda spread by a small minority group whose sympathies and principles are opposed to our American system of individual initiative and enterprise. If they are permitted to continue their subtle attack, we may face eventual regimentation and a totalitarian state. We as individuals should decided here and now whether we want to travel that road. If we do not, then we should shoulder the responsibility of defending, yes, even fighting for our American system.

Wendell Willkie concisely and clearly stated this proposition in his recent petition and declaration, "We, the People"*:

"In this decade you have separated 'business' and 'industry' from the ordinary lives of people and have applied against them a philosophy of hate and mistrust, but we, the people, say: business and industry are part of our daily lives; in hurting them you hurt us. Therefore, abandon this attitude of hate and set our enterprises free."

"In this decade, under the banners of reform, you have usurped our sovereign power by curtailing the Bill of Rights, by short-circuiting the states, and by placing in the hands of a few men in executive commissions all of the powers requisite to tyranny; and we the people, say to you: we do not want a monopolistic government any more than we want a monopolistic industry. Give us back the powers that our forefathers declared to be ours; liberate us to govern ourselves by *law*."

I need not tell you that this freedom is a priceless thing. It and the right of self-determination are something we must fight for, collectively and individually.

There is another responsibility that vitally affects our welfare which we should not overlook. There are many times when we are too prone to look upon ourselves as a manufacturer, a retailer, a utility man, a wholesaler, or a contractor, forgetful of the fact that as such, we are a member of a whole industry as well. By its very nature ours is a complex industry. But this need not becloud the fact that there are definite interrelationships and an interdependence that vitally affect our individual and collective welfare. We should never overlook that fact that none of the branches of our industry, and hence none of the members of those branches, can succeed without the help and understanding of the other branches.

* "Fortune," April, 1940, p. 65.

"We must vindicate our position by comparison. Does the historical cost of building and rebuilding the highway and other public services provided by government indicate the superiority of government in meeting constantly changing conditions? Does anyone believe that the accomplishments in our industry would have been greater had government assumed the responsibility of building, owning and operating the light and power business since its inception? History will reveal that our industry has met its responsibilities as well as the government.—C. J. Strike, president, Idaho Power Co.

There is no recent example which better illustrates the readiness of the private power industry to meet changing conditions than is found in the two contracts—one between Southern California Edison Co. and Pacific Gas and Electric Co. and the other between the Edison company and San Diego Consolidated Gas & Electric Co. These contracts, voluntarily arranged by the three companies and formerly approved by the Railroad Commission, pave the way for distinct savings by the contracting parties and the consuming public as well. In both cases the immediate installation of additional steam capacity has been obviated. Particularly in the case of the Pacific Gas & Electric Co., this represents a real public economy, as it will provide for the shift of surplus power in the south to the north pending the arrival of power from Shasta. These arrangements were made with a minimum of effort and the entire absence of red tape, and demonstrate that regional planning and cooperation can be effected voluntarily, without governmental compulsion.—Harry J. Bauer, president, Southern California Edison Co.

So I offer the plea that as individuals we constantly strive for industry solidarity. We need mutual understanding. We should not provoke intra-industry animosities. We should endeavor to maintain a considerate appreciation of the other fellow's point of view. Only by achieving the maximum correlation of purpose and cooperation may we expect to grow and progress.

A responsibility which, by its nature, is bound to be underestimated is that of being a good citizen of the democracy. With most of us, the satisfaction of regarding ourselves as good citizens arises mainly through our being fairly conscientious about claiming income-tax deductions and taking our hats off when the flag goes by.

Outside of these none too exciting occasions, our citizenship tends to occupy about as much of our conscious thought as does the responsibility of winding our watches.

It seems to me that there are dozens of ways in which each of us might extend his influence as an American citizen, doing so to the immense benefit of himself, his company and the citizenry at large. Might not each of us, for example, be on a little better terms with the milk man, or the mail man, or that "queer guy" who lives two houses down the street?

The fact is that the "queer guy" probably sees us in the same way, and that the very slightest overtures would change opinions on both sides. Similarly, a small part of all our business and social actions might be animated by the consciousness that we are as significant a part of the community as anybody else.

The collective weight of such a motivating spirit, if exercised by all of us, even to a slight degree, could work magical results. For we *are* this electrical industry, about which our community has some opinion, whether good or bad. If the community fails to make the connection, if the community sees the electrical industry as anything except ourselves, it is our fault; it isn't theirs.

W. W. GLOSSER

The community, or the citizenry, or what you will, is pretty self-sufficient and tends toward suspicion of suggestion from outside itself. It behooves us, therefore, to avoid the position of being outsiders looking in. The inside track is wide open, and to move along it requires nothing more than an interested participation in the community's multiple affairs.

So far I have avoided mentioning our most important responsibility, because it is one of which we are so well aware —the responsibility of doing our own work well.

It is a safe bet that most of us are thinking about this in one way or another almost all the time we are at work. But I sometimes wonder if that very habit doesn't lead us to underestimate its full weight. Haven't we a tendency, for example, to think of this responsibility as being practically the same from day to day?

We don't have to look back many years to see the new shades of meaning that this responsibility has taken on. For instance, today our job includes not only doing the task itself well, but also shouldering the burden of proof that it was so done. Yet who can identify the day on which he took a fresh look at his own work in the light of this new fact?

As individuals let us not forget the value of integrity and intellectual honesty. Some of our critics may be derelict in the exercise of these virtues, but that should not serve as justification for our ignoring them. If we would but observe the precepts of the Golden Rule in all of our daily dealings, many of the problems that confront us as individuals, as units in the industry and as an industry itself would disappear.

Our final responsibility is a vital one. It is that we should forego complacence and self-satisfaction. We are living in an era of change, whether we like it or not. It behooves us to keep step, or even better still, to be out in front. The past few months have given us a striking example of the dangers of complacence and a false sense of security. We need only contemplate the fate of some of the so-called neutral states of Europe to appreciate what happens when we fail to be alert. Smugness invites a *blitzkreig* on the part of some aggressor.

As individuals in a great industry with a great heritage, and with even greater opportunities for the future, each of us must assume his full share of responsibility. It is the only way in which we can go forward. It is the only way in which our industry can earn and justify the confidence of the American public.

"It is disturbing that after nearly eight years of the 'abundant life' so many millions of our people (perhaps the majority of them) can still pursue the illusive 'will of the wisp.' It is encouraging that it has suddenly become respectable to be a public utility man. This is truer now than for any time in many years. Hence Wendell Willkie and his standing with thoughtful men and women in all strata of life. Willkie is a fighter. It is very evident that if the public utility industry has a message for the people, they will listen. But the message must be a real one." —H. A. Lemmon, president, Sierra Pacific Power Co.

TIME FOR A DOUBLE-BARRELED OFFENSIVE

By J. E. E. ROYER
Washington Water Power Co.

I AM AGAIN pleased at the opportunity offered by ELECTRICAL WEST for addressing the members of the Northwest Electric Light and Power association as though we were assembled in a convention hall, as I did seven years ago. And I welcome the interest of those who are not members of the association but who, as readers of ELECTRICAL WEST, may pause to glance over my remarks and the various convention reports.

In 1933, in the midst of the depression, I offered you a slogan in the title of my paper, "Stay With It And Fight For It." You have been staying with it and fighting for it ever since—and I believe you are making progress.

You have made progress in many directions—in lowering rates, in increasing efficiencies and in sharing the tasks of civic and community betterments. But there is much yet to be done; new responsibilities have risen to take the places of tasks completed.

For many years the purpose of our association coincided with the purposes of our individual companies. They were threefold—to extend electric service, to improve electric service and to lower rates. These fundamental purposes remain, and with undiminished importance. Two other important activities must now be added to our agenda. We must secure for our companies and our industry a greater public enthusiasm, and we must do all in our power to help dispose of the vast number of kilowatts that will become available as the federally constructed projects reach completion.

The history of our industry and, similarly, the history of our respective electric service companies has been one of ceaseless activity. Since the beginning we have been steadily building plants, building lines, carrying on financing programs, building loads—year after year we have witnessed the steady growth of the various companies.

If we were remiss in anything during that period, we were remiss in telling our story. We probably assumed that as long as we did a good job of delivering electric service — dependable service at reasonable rates—the public would think well of us. In the normal course of events such a conclusion would have been correct. But antagonistic forces which had been latent for many years flared up during the depression. And their attack is still continuing.

J. E. E. ROYER

Such an attack does not call for a defense, but rather for an offensive. It can be met successfully only by a positive, continuous program of public relations.

In the last few months the long-gathering clouds of war have broken over Europe—the dictators have shouted their defiance to the democracies of the world and have let loose the organized forces of mechanized havoc. In seeking to impose their "isms" and philosophies on other nations they are gambling everything on a reckless throw of the dice of destruction.

In view of the tremendous upheaval that is going on across the waters it behooves us to re-define Americanism and what it means. More than anything else it means freedom — freedom in thought, word and action. And the time to begin defending that freedom is now.

The electric service industry is typically American. American genius and free enterprise are responsible for our industry and for its outstanding contributions to our industrial, agricultural and domestic life. Under the American system we have been free to conduct our researches, to develop resources, (both material and human) and to make our services available to all without favor or discrimination. That we have been successful is due to the energy and initiative of the men and women who have given their lives to this industry.

Because it is typically American, our industry has been singled out for the initial attack. If it goes down to defeat the attack will press on, seeking to overcome other industries typical of the American system until finally Americanism itself will be in grave jeopardy.

It becomes our duty and our responsibility, therefore, to do all in our power to impress our customers and the public generally with the true story of the private utility. We have a good story —a true story—and it will stand retelling time and time again.

Let that be the first order of business. Turn the light of public relations on every action which is contemplated, every policy which is about to be adopted. Everything we do can be made to contribute something towards the formulating of a favorable public reaction.

We are, or soon will be, surrounded by kilowatts from federally constructed projects. Millions of dollars of the taxpayers money have gone into the projects for the production of these kilowatts. And whereas, with a private utility, installation of new generating capacity is in direct proportion to possible markets, these new kilowatts do not have a market in view. The market must be found.

We must help to find that market, we must help to dispose of those kilowatts, through a program of coordination and cooperation. Coordination and

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"Recent statistics of the electric light and power industry once more demonstrate the progressive vitality of this important branch of America's social and economic structure. In spite of the development of large Federal power projects in recent years, 90 per cent of all power generated in 1939 was produced in privately-owned plants. The penetration of electric service to the most remote areas continues without interruption. Not only is the power industry inseparably geared to American progress, but no industry has made a greater contribution to American living."—James B. Black, president, G and E.

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cooperation will save taxpayers and ratepayers alike from the needless waste and inefficiency which results from duplication and competition. It is an economic fact, axiomatic in this industry, that any substantial market for kilowatts cannot be created over night. We know that neither the availability nor the cost of a kilowatt will put that kilowatt to work. Even that type of industry which uses electricity as a principal productive process, such as an electrochemical or electro-metallurgical industry, does not find the cost of power to be a major determining factor in the choice of location.

The average industry finds the cost of power to be something less than two per cent of the cost of the manufactured product. We can readily see, therefore, that power at the lowest imaginable cost is not sufficiently important to justify the transfer of established industries from one part of the country to another.

Consequently we cannot wait for industries to be attracted to the Pacific Northwest merely because of the availability of a vast number of kilowatts of capacity. But, through a plan of cooperation by private utilities and federal agencies, we can create other inducements to potential industrial power users.

For example, one course might be the encouragement of a favorable tax situation, for taxes loom large in the life of any industrial establishment. Private utilities now contribute large sums to federal, state and local purposes and the payment of this tax money reduces appreciably the amount other taxpayers, including industries, must pay. If the private utilities were removed from the scene, the effect on the tax situation would be serious and would be a definite deterrent to the location of industries in this region, as well as harmful to the operations of our present industries.

Similarly, the paralleling of existing lines would be wasteful and extravagant, for someone, either the taxpayer or the ratepayer, would have to pay for the erection and maintenance of lines which would not be actually necessary.

We can assist materially in the disposing of these new kilowatts through stimulation of our sales activities and through the securing of greater efficiencies in operation. The latter possibility should prove a stimulating challenge to every engineer in the industry because it indicates an important shift in the sphere of activity of the engineer. Engineers have made major contributions in the past in the construction of generating facilities; but the completion of the large federal projects closes the gate for many years to come on this avenue of opportunity. This situation focuses our attention on the value of research and ingenuity in the fields of transmission, distribution and operation activities.

The major challenge, of course, is to those in the sales end of the industry. As I have pointed out before, these new kilowatts are going to have to be sold —and I might almost say that it is to be a selling program without quotas and without limitations. To achieve success the sales forces must work not only with imagination and persistence but must also recruit to their assistance the rank and file of those engaged in the electric service industry.

The future is not as discouraging as some may imagine. There is a way out, and that way lies along the avenue of cooperation and coordination, and if we illuminate it with intelligent public relations we will not lose our way.

"Individual initiative and individual liberty are complementary and inseparable. When government enters into business competition with its citizens and through restrictive laws and multifarious bureau rules and regulations takes away opportunity of reward for the individual, then individual liberty is doomed and we are headed for the totalitarian state and a regimented citizenry. By keeping open the road of opportunity and the goal of adequate individual reward, we are preserving the tenets of liberty upon which this country was founded."—George M. Gadsby, president, Utah Power & Light Co.

BONNEVILLE SPEAKS TO PORTLAND

PAUL J. RAVER, Bonneville administrator, tossed the Federal government's gauntlet into the ring in which Portland Ore.'s PUD fight was waged in a speech at Reed College in that city May 1. Although he disclaimed authority to enter local campaigns under the Bonneville Act, his speech, which was a vituperative attack on the local private utility industry, was obviously designed to influence votes in favor of the PUD proposal under consideration in Portland, and of a further extension of government ownership in Bonneville's field of operation.

"I am ordered at all times" he said, "in selling this power to give preference and priority to public bodies and cooperatives, and right here we come to the relationship between the Bonneville program and the public ownership movement in the Northwest . . . Congress foresaw that few communities in the Northwest would be willing to have Bonneville power generated and transmitted to their doorsteps at cost and there handed over to privately-owned companies for distribution at such profits as the companies might be able to make. The Bonneville Act therefore gives public agencies and cooperatives first call upon Bonneville's power.

A portion of Raver's speech was devoted to an attack on holding companies, with particular reference to the stock-selling activities of Central Public Service Corp., one-time owner of Portland Electric Power and its subsidiaries. Holding company abuses, he said, led to the passing of the holding company act of 1935, and to the additional regulatory influence of "yard stick" rates established in areas in which the Federal government embarked on power production such as TVA and the Pacific Northwest. Holding company purchases of operating properties, he said, were made "at inflated values based on the assumption that high rate levels would be maintained," and added: "Then, to preserve their empires against competition, they fought every effort of the public to establish publicly-owned systems."

Attacking duplication of distribution facilities of the two Portland companies, Portland General Electric Co. and Northwestern Electric Co., he said, "Portland is entitled to lower rates than it is now getting," implying that public ownership would bring this about.

He accused the utility industry with fighting the encroachment of public ownership saying, "Naturally the private utility management with lucrative jobs at stake has wanted to remain in the business, and so has attempted to obstruct, delay, and discourage establishment or acquisition of publicly-owned systems, even after an electorate has voted for publicly-owned operations."

PAUL J. RAVER

He charged the private utility industry in the Northwest with obstructing the Bonneville program, citing the appearance of the president of The Washington Water Power Co. before a hearing in Washington, D.C. on the Bonneville budget, with the protest that Bonneville was spending the people's money unnecessarily on duplicating transmission lines and with the attempt to show how Bonneville lines could be coordinated with existing transmission lines more economically. Raver said, "My reply to that proposal was (1) that it would prevent carrying out the intent of Congress; (2) that the existing transmission lines of private utilities are insufficient to carry Bonneville power and hence, the Bonneville lines do not duplicate existing lines; (3) that it would leave the new generators standing idle at the Bonneville Dam and later at Grand Coulee; (4) that it would defeat any public ownership movement in this region. It is exactly the kind of attitude taken by that private company, controlled by the largest holding company system in the country, that interferes with the widest use of power at the lowest possible rates."

He cited another obstacle that could permanently nullify the Bonneville program, as being "the continued opposition of private utilities in the Northwest to the establishment of publicly owned systems in spite of the wishes of local voters. This opposition starts from the time attempts are made to put a proposal on the ballot and sometimes continues through all attempts of a public utility district to set up and operate its own system." He went on to commend West Coast Power Co., Willapa Electric Co., Grays Harbor Railway & Light Co. for having "cooperated to a reasonable extent" by selling their properties to PUDs in Skamania, Wahkiakum, Pacific and Grays Harbor counties respectively.

Still another obstacle, he said, would be the inertia among the people of the Northwest, "a satisfaction with things as they are, a surrender to the notion that since average power rates in the Northwest are lower than in the nation as a whole, why worry about getting lower rates?"

The last obstacle to the accomplishment of Bonneville's program he said "Rests in the attitude that leaders of the privately-owned utilities choose to take toward the concept of the widest distribution of power at the lowest rates. If they were to champion this program through aggressive policies—by promotional rate cutting, by elimination of unnecessary charges to operations, including unreasonably high salaries of executives, and by voluntary mergers only where economical results can be gained, there would be little demand for public ownership."

He summed up the policies of the Bonneville Power Administration in these words: "(1) The Bonneville Power Administration will render every possible assistance to established public agencies desiring to use Bonneville power; (2) With due regard for the rights of its customers it will negotiate resale rate contracts designed to insure the ultimate consumer the full benefits of its low-cost power; (3) It will encourage the development of public ownership on a sound basis in every instance where such development is essential to the fulfillment of the policies of Congress as expressed in the Bonneville Act."

THE IMPORTANCE OF PRIVATE ENTERPRISE

By PAUL B. McKEE*

THE ELECTRIC INDUSTRY was born as an industry about 50 years ago. I found myself employed in it at the age of 22, and have spent nearly 27 years in this business and in this industry, or more than half of the lifetime of the industry. During this short period of fifty years, the industry has developed from nothing but an idea to the point where today there are more than 12 billion dollars of the money of millions of our people invested in it. The industry today serves more than 25 million customers, and more than 48 million horsepower is constantly present in its transmission lines and its distribution systems, available at the press of a button to do the work of millions of households, and to turn the machinery in our great factories. This great industry was built by individuals who dreamed and planned and worked, who risked their own savings and accepted the responsibility for giving life and force to their plans, the responsibility for directing the efforts of others, and the responsibility of securing an earning, a profit if you please, on the pooled investment of the thousands of others who were willing to go along with them.

As a whole the electric industry has had a brilliant and healthy record. As the use of electricity developed, as technical improvements were made, as economies were effected through tying together small and isolated plants, rates have been steadily reduced. The industry for the past 27 years has been regulated by local and state agencies, and more recently also by federal agencies, until today not a move can be made to sell a security, to modify rates, to establish service rules, or to perform any one of countless other acts without approval of local or state authority, or of one or more federal agencies, and sometimes by one after the other. No other industry is more completely regulated. No one I know in the industry objects to fair and comprehensive regulation.

Increasing knowledge of the effectiveness of this regulation will be distinctly helpful to all concerned. It brings assurance to rate payers of a fair deal and efficient operation, and assurance to investors that their money will be carefully utilized. Pride of performance on the part of management is of itself a powerful regulating force in the public interest. There have been mistakes and losses in the past but let me emphasize that such losses have been taken by the security holders, and not by the taxpayers or the customers. Under regulation rates are based on legitimate investment in used and useful property, not on stocks or bonds or on money spent in mistaken or imprudent ventures.

There have been mistakes and losses in other businesses, and woeful disappointments in government. Today we are proud of our banking system. I know that our governmental structure, local, state and national, has the confidence and respect of our people. But there have been mistakes and abuses in the banking business, and there have been glaring mistakes and abuses, and even crooked dealings, in government. We do not condemn or destroy our form of government, nor do we condemn or destroy, or even "take over," our banking system, because of these mistakes. We are all conscious that professional "medicine men" are now trying to dig up a few of these dead horses in utility operations, in the hope that we will be sickened into experimenting with their quack and dangerous prescriptions, but practically minded citizens are not so easily taken in. We know the corrections have been made, and that further corrections will be made, and that further corrections will be made when demonstrated to be necessary. Let us make use of our system to the best advantage and go forward with it.

The last ten years in this country have been critical years for the electric industry as well as for business generally. We have gone through years of depression, years of uncertainty. Yet during that time the average annual residential use of electricity in the United States has increased from 500 kw.-hr to nearly 900, and the average rate per kilowatt-hour has decreased from 6.3c to 4.06c

* President, Pacific Power & Light Co. Extracts from an address delivered at Reed College, Portland, Ore., May 8, 1940, answering charges made by Dr. Paul J. Raver, Bonneville Administrator, in a speech before the same group on May 1. Extracts from Dr. Raver's address appear on the preceding page.

Those of us who are in the utility business recognize that its future and the interests of our security holders are firmly and inevitably bound up with the area we serve. We cannot be prosperous unless they are prosperous. We cannot export kilowatt hours or thousands of feet of gas to the Orient or even to California.

We in the utility business realize that one of the important lubricants necessary to enable the wheels of enterprise to turn and produce results is cooperation. All of us who have been brought up in the modern business school realize that through cooperation progress and development result, but that war between companies and customers or between industry and government accomplishes only disruption and stagnation. We of the West want and must have progress and development. We are still in a relatively undeveloped state. Therefore, when it was announced that the federal government intended to invest money in great power, navigation and irrigation projects on the Columbia River, it was perfectly natural for people in our industry to declare that we stood ready to cooperate in every possible manner consistent with the interests of our security holders and the public to help make these governmental projects a success. There was nothing mysterious about the formation of this policy; it was the natural and the logical thing for us to do. The entire investment which we represent, and

PAUL B. McKEE

the welfare and future of all of the several thousand employees to whom we owe a great obligation for their unfailing service, depend upon the prosperity and development of this area.

Any government-subsidized source of raw material, whether it be power or coal or iron or timber is bound to be helpful to the locality to which that sub-

sidy from the whole nation is given. We were encouraged by this knowledge, and by the statements made by President Roosevelt in Portland on Sept. 21, 1932, in which, after pointing out the undeniable right of cities and public bodies when they are not satisfied with the service being rendered or the rates charged by a public utility to go into the business for themselves, he stated, and I quote:

"I do not hold with those who advocate government ownership or government operation of all utilities. I state to you categorically that as a broad general rule the development of utilities should remain, with certain exceptions, a function for private initiative and private capital."

And he went on to say that there are exceptions, and again I quote:

"Again we must go back to first principles: A utility is in most cases a monopoly, and it is by no means possible in every case for government to insure at all times from mere inspection, supervision and regulation that the public shall get a fair deal—in other words, to insure adequate service and reasonable rates, rates as low as you have in Portland where they are lower than in many other cities throughout the country."

In speaking of his idea to bring about the development of great federally-owned hydroelectric projects, he stated as follows, and I again quote:

"State owned or federal owned power sites can and should properly be developed by government itself. When so developed, private capital should be given the first opportunity to transmit and distribute the power on the basis of the best service and the lowest rates to give a reasonable profit only."

The companies in Portland in our opinion and, I am sure, in the opinion of impartial authorities, meet these specifications.

It seemed to us in the utility business that here was a fair and constructive offer of cooperation between the private utilities and this great government-subsidized Bonneville project, which would result in great benefits to all the people of this region. Accordingly, only a few days after the President had announced his intention to authorize the construction of the Bonneville dam, I made the following public statement in behalf of the Northwestern Electric Co., which appeared in the *Oregonian* of October 8, 1933:

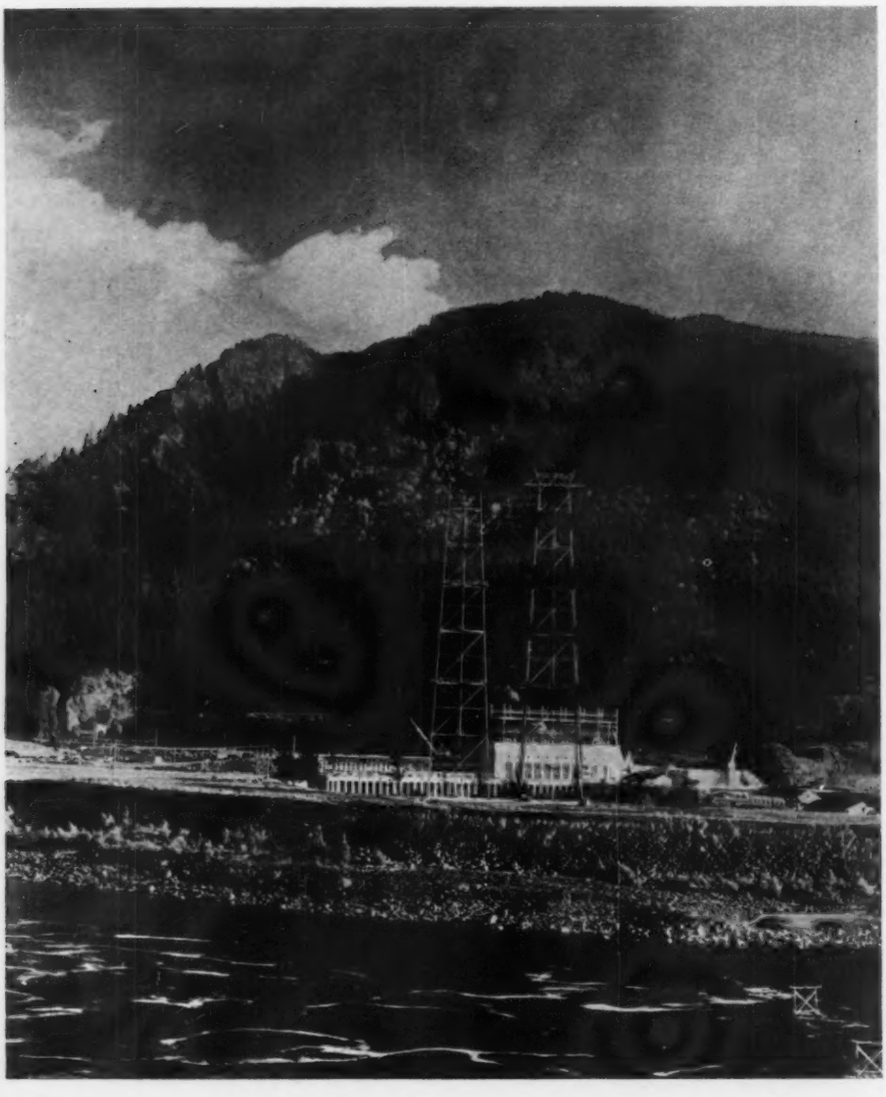
"This is a time in the history of Portland when there has been 100 percent unity. Let us preserve that unity and turn it to further use in bringing about a bigger and better city where all may share in the benefits of industrial development. Let us not lose sight of that valuable unity in our enthusiasm of the moment. We have won the Bonneville project, which everyone wanted; let us now lend our unified efforts to seeing this dam through to completion.

"We have frequently been asked about our position regarding the development at Bonneville. This development is part of the program for improvement of rivers and harbors, and all of the money required for it is being provided by the federal government. The plan is to build a dam for purposes of navigation and power development. While there is a substantial surplus of electric power in this district at the present time, nevertheless the construction of this dam entirely at the expense of the federal government should be accepted and the best possible use made of it.

"If the federal government will sell the power at low enough rates, it is possible that some large industries of a kind not operating here now may be attracted. This company has already publicly evidenced its definite desire and expectation to cooperate actively in efforts to bring industries here, also to utilize as much of this power as it can upon a proper economical basis.

"Most industries spend for electrical power a maximum of 1½ to 3 per cent of what it costs to manufacture their products. However, for certain classes of heavy industries the cost of power represents a larger percentage of the total cost of manufacture than the above figures. Ordinarily, as it can be readily understood, the location of an industry is not determined because of cheap power. Other factors, such as transportation, supply of raw materials, availability and nearness of major markets, taxes and satisfactory labor and climatic conditions are much more important than the cost of power.

"There are some industries, however, as to which a governmentally aided, low cost power supply may represent an important inducement in the location of new plants, and it is this type



of industry which it is hoped will be attracted to this locality if the federal government provides substantial blocks of power at low cost.

"We do not feel that the federal government will compete with legitimate private enterprise and are confident that the rights of our security holders will be adequately protected by a reasonable policy and fair attitude upon the part of the federal government."

This statement made six and a helf years ago is still the platform on which we stand, and events during the years have justified our position. We have also been encouraged to attempt to bring to fruition this cooperative policy with Bonneville by the ever-increasing use of our service, and by the apparent realization on the part of thousands of people living in this area that they now enjoy the benefits of very low rates from companies which are carrying a staggering burden of taxes.

Refinancing

For my own part, I have been further encouraged as a result of my experience of last year when it became my duty and opportunity to help to bring about a refinancing of the Northwestern Electric Co.'s then outstanding 6 percent bonds and 6 percent notes. After months of exhaustive investigation by the Securities and Exchange Commission, during which every detail of the company's business and management was investigated microscopically and exhaustively, we were authorized to issue and sell, if we could, $6,700,000 of bonds at 4 percent and $2,800,000 of notes at 4½ per cent. The cost of this money to the company is lower than the cost of the money recently obtained by the Grays Harbor Public Utility District through the sale of its revenue bonds. One reason for this is that there was not included in our cost any 2½ percent commission to a Wall Street promoter, who now has financing contracts with most of the Washington PUD's. As you probably know, the issuance and sale of the securities of such districts do not come under the jurisdiction of the Securities and Exchange Commission or of any other regulatory body. You may also be aware that the rates of the Grays Harbor PUD are considerably higher than our rates in Portland; that if at any time its revenues are insufficient to pay the interest and amortization charges, the arrangement with the bankers requires the rates to be raised; and that such rates cannot be controlled by any state or federal commission if it should become necessary to raise the rates to meet fixed charges and operating expenses.

Our companies are cooperating with Bonneville. We hope we may be permitted to continue to do so. We have stated publicly on any number of occasions that we will purchase such amounts of Bonneville energy as can be utilized advantageously and will pass on to our customers all savings that may result. We have suggested a basis for fair, cooperative use of our transmission facilities. During the period from August 18, 1938 to December 31, 1939, Northwestern Electric Co. transmitted many thousands of kilowatt-hours from Bonneville to Portland, to take the place of steam-generated energy in Portland, all of which was prior to the time any government-owned transmission lines had been built from Bonneville to Portland. As a matter of fact, today the much talked of Forest Grove and Canby systems are being served, not over Bonneville lines, but over the lines of Portland General Electric Co. under a cooperative arrangement which that company has made with Bonneville.

Preservation of Enterprise

In discussing private enterprise, let me make very clear my deep-seated conviction that the preservation of free enterprise in America is essential to the preservation of free government in these United States. I believe it to be a responsibility of American citizenship to oppose the efforts of any group bent on destroying a legitimate private industry through tax-free, government subsidized competition, because if one group can succeed in doing this to one industry, then the same kind of group and the same tactics can be used to destroy all free enterprise.

Fundamentally, there is no difference between the reckless use of antagonistic, government-sponsored propaganda to wreck the private utilities and the use of these same methods to destroy our democratic form of government itself.

We in America cannot bring ourselves to imagine an America of the future devoid of enterprise, of initiative, of individual self-respect, or of opportunity.

We in America *must* in these days consider that the threats to all of these qualities that have come to describe America to us, and to differentiate this nation to us from the other nations of the world, are only temporary and transient threats—that we will and must outlive them.

I believe in private not political operation of business. I believe that all business must be reasonably regulated by the government in order to avoid abuses. I do not believe that government should undertake any more business than is really necessary to provide goods or services not otherwise obtainable on satisfactory terms. Neither do I believe in surrendering our local home rule and local control over business and government to an all-powerful bureaucracy in Washington.

It has been said that our companies have resisted the selling of sections of their properties. Anyone who represents the owners of a house or lot or a factory or a public utility system must, if he is to discharge his responsibility in the proper manner, be prepared to present to his associates any fair offer which may be made to him by a legitimate purchaser. No such offer has been made to us. While I do not believe in public ownership of electric utilities, I wish to make it very clear that any time a legitimate purchaser presents an offer for a substantial section of the properties which I represent, that offer will be promptly reported to the stockholders for their approval or disapproval. However, inasmuch as we are dealing with a public matter, I insist that any offer of this sort should have the voted approval of the residents of the area involved, setting forth clearly and distinctly just what the proposition is and how it affects them and their property. I will not make any "back-room" trades with any promoter working for a large commission which, if the deal is in the public interest, no one should have to pay.

No Quarrel

In closing, may I say that I have no quarrel with Dr. Raver. I recognize the very difficult situation in which he finds himself. I recognize that he is being pulled and hauled between what I consider to be a fair, logical and workable program of cooperation with existing utilities, and the desire of certain elements here and in Washington who wish him to force all of the private utilities of this area into public ownership. I have enjoyed my personal contacts with him. I expect to enjoy more of them in the future. I feel confident that in the end it will be rocognized that cooperation between the government agencies and the existing utilities will bring about the maximum of progress and development.

May I further emphasize in concluding that I, for one, believe that a country like ours with its resources, its highly intelligent and well-educated population, and its government of free and liberal men and women, can never be licked either in an economic, a political, or a military sense as long as we maintain the American way of doing things. Our economic machine is in good order. It is ready to go forward and to produce. Nothing can stop us if we keep the bearings lubricated with a reasonable degree of mutual confidence and cooperation.

HOW THIN CAN WE CUT IT?

While still we may, some Free Speech about Government by Business

LAST stand of that well known quartette, "freedom of speech, assembly, religion and press" seems to be America. While yet there was opportunity to exercise these privileges ELECTRICAL WEST addressed a simple query to representative business men in retail distribution, wholesale distribution, among manufacturers agents, electrical contractors, and utility sales department heads. They were urged to "get it off their chest" for the good of the business.

"How is government affecting your business?" each was asked.

Amazing answers are still coming in as these pages go to press. But most amazing has been the number who caution, "don't quote me." This of itself is indicative of fear that what they say may be used against them, a measure of the degree to which freedom has already been abridged under psychological pressure.

The answers themselves are realistic and significant. A clue to some of the ways government could redirect itself to stimulate employment, to lower costs of distribution, to accomplish some of the social ends presumably being sought now through other ways that are retarding instead, can be found in these answers. A government administration genuinely interested in finding sound ways to accomplish such ends could find important hints in these comments.

As reflected here, that margin between cost and selling price is being cut so thin, because of the increasing slice for taxation, that business, in order to survive, is cutting employment too. How thin *can* profit be cut and still keep business alive?

IN RETAIL DISTRIBUTION

ANSWER from all is that government has moved into retail and wholesale business, decidedly. That it has given encouragement to "consumer" and cooperative movements which attack it from the rear. That the frontal attack is through taxation and heavier overhead burdens of keeping the books and records necessary. Between these the retailer is squeezed.

Expressing it eloquently for others, Fred H. Voss, of Pueblo, writes, "Little relief can be expected for years to come regardless of the party in power. Forty billion dollars must be paid back. Like it or not, government is and will be our silent unproductive partner for years to come."

Another phase of it is expressed by Fred Schoss, of Ogden. "The number of government reports that we are required to fill out and the taxable items in a small business like ours requires one person to take care of the reports and clerical work. The men we used to hire years ago are now working on WPA. They were good salesmen, but were not interested in making more than $100 a month. Today these fellows do not have the initiative to go out as salesmen for they can earn approximately $60 a month and only work 15 days on WPA."

A distributor says, "The situation has not reached a state where it has become unbearable. If, however, additional supervision and taxation should creep into the picture, the situation would be crippling to business progress, and of course, incidentally, employment." Another writes that now "we are more or less prone to pull our punches and not follow through with the same intelligent enthusiasm and aggressiveness that we believe is necessary—for success."

Leading into a second phase of the present trend is an observation by a manufacturer's agent. "One of the most objectionable conditions that affects dealers directly is the unfair competition in coast cities where the navy hangs out. It is 'ships service' and post exchanges, through which it is possible for relatives close and far removed to purchase nationally advertised appliances at less than advertised prices."

"Our experience has shown," says a distributor, "that the consumer movement has encouraged vigorous attempts on the part of the public to purchase at wholesale through various channels. The buying public has become rather brazen about it. It is undoubtedly the result of the propaganda and teachings prevalent today."

"In some locations," says another, "we find that everyone wishes to buy at wholesale prices and believe it or not, distributors, being hungry for business in those areas, are catering to this type of business. In most cases people can well afford to pay the retail price."

Of consumer cooperatives, which one dealer calls, "the bastard child of false economy," he goes on to say, "these consumer organizations have no means for research or development. Certainly they have no method of educating the potential user. Since profits would be small, little money would be available for promotions. The very nature of their organization discounts any possibility of competition. Their attitude of necessity would be, 'This is what we have. Take it or leave it.' Methods of modern

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It seems to me that rather than chisel each other out of business by giving extra cash discounts, we would all be better off to pay a little more in taxes and a little more on the retail price and keep the dealer and distributor organization intact, rather than cut prices, cut profits, and lay off help. Most every electrical appliance today will pay for itself in savings of time, electricity, and useless labor. Therefore if there is a better and more efficient way of doing things I see no reason why people in the lower income brackets would not benefit more by buying at a standard quality and price. In my opinion there is no short cut to the ultimate goal in the long run.—Gordon Wilkins, Ironrite distributor, Oakland.

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distribution may be costly, but they definitely are not wasteful."

That the long range social advantages are in favor of regular distribution channels is hinted in several letters. "It makes for a more satisfied personnel with better income and produces much more prosperous conditions than the type of set-up in chain stores where the employee's earnings give him a very meager living."

"Cooperative or mass chain operations, however," points out Frank J. Airey, experienced in wholesale and manufacturer distribution, "are proving to be better operators because they are making available to the greatest number of people at the lowest possible cost, all types of appliances and other products at convenient locations, with low purchase price and broad selection. They are in a far better position to serve the low salaried man, the budget-pincher, the volume buyer, all types, classes and creeds."

One department manager for a large department store said, "Manufacturers in their endeavor to beat each other with no regard as to what is a proper retail outlet for their products have made a miserable mess of the so-called established retail prices."

The gem of answers came anonymously from one who called himself an "old fashioned retailer of appliances who wonders if we are not trying to cut too many corners in our everlasting fight to buy and sell things cheaper.

Why Not Chain Education?

"There is no end to the corners that can be cut," says he. "For example: Teachers and educators are among our strongest advocates of consumer cooperative buying. They are ardent chain store boosters, and seem to have an idea that independent retailers are unnecessary in our present economy. Granted that dollars can be saved by eliminating the independent retailer today, let's carry the idea to its ultimate conclusion.

"Why not buy our public education in the cheapest way possible? Here is how: Professor X is without doubt the best in Economics in our country. Why not let Professor X talk, not alone to his own college, but to some 99 other colleges at the same time? It is very simple. The local radio broadcasting does the trick with loud speakers in each Economics classroom. The student would hear better Economics (?) and 99 professors would go home to twiddle their thumbs, or go out and buy from their own cooperative or national chain store—but with what?

"Ninety-nine not quite as efficient or good professors' salaries would be saved by putting Economics on a national chain store basis. This is a lot of fun when it is the other fellow, not you, that is pinched."

IN CONTRACTING

POINT of view, it is said, is everything. Certainly point of view differs in the contracting field, possibly because it is such an individualistic business. As to how government affects the contracting business there were two diametrically opposed viewpoints expressed.

"Beneficially," said A. L. Stone, of Los Angeles. "Let us assume that business is charged with the responsibility of supplying goods and services to the public, and when I say services to the public I mean *service to the public*, not just the clover field type. Now as long as business functions honestly and fairly along this basis, Government will never move it. But just to the degree that business fails. just to that degree must government move in and take up the slack, it matters not whether it is a recalcitrant business, or a business held back by lack of capital or other reasons, that fails to do its job.

"If business will trim its sails and eliminate a lot of patent medicine remidies and get down to fundamentals, realizing there is no short cut to success and that nobody nor no system can pull its chestnuts out of the fire, and then go out and sell its organization, fairly and honestly supplying good merchandise at fair prices and rendering the kind of service the public demands, then we need have no fear of government competition or, for that matter, that other bugaboo, 'chain store competition'."

"We must keep one point in mind and that is that government wants business to make money and will go a long ways to assist it in this accomplishment. For how else can any government function if business is not successful? And where is the man that will get on his feet and say we haven't a house cleaning job to do? It is up to business to prove it can do the job but we must rid ourselves of a lot of screwy ideas."

A contrary view is expressed by nearly all others. Some years ago contractors felt free of the shadow of government. Their only contact with it was through the local ordinances regulating wiring and licensing. But these were government in their interest, and hence not cause for concern. Today it is different. As V. R. Knight of San Diego puts it,

"The government is moving into our business more rapidly than we possibly realize. Beginning with NRA it looked as though there was a place in the picture for a standardization of conditions and practices which would improve matters for all contractors. With the loss of NRA the bottom dropped out of the whole thing and we find the contractor has been largely out of the picture in all cases now where the government buys its own material and employs its own men. The PWA is a fair example. The wholesalers of materials, together with manufacturers, their agents, distributors benefitted all the way down the line but it all stopped before it reached the contractor. Virtually all of the above have been on government relief rolls since 1932-3. Why not the contractor?

"Close scrutiny of government operated crews doing electrical work discloses that there is no control on the price of the material or the labor. They have budgets allowed and these are always ample. If the budget is not sufficient additional moneys are raised to meet the needs or the project is held over until the next fiscal year. In most cases these government jobs are preferred by electricians to work in contracting shops, as they are allowed sick leave of 15 days a year, two weeks vaca-

I have been patiently awaiting for some one to invoke the anti-trust laws against some of the national chains from the standpoint that their buying, distribution, money power has become such that through this combination they are restraining trade by eliminating competiion and creating monopoly, to say nothing of the influence they undoubtedly wield with some government officials. I sometimes wonder if such an action would not be beneficial. Rough statistics indicate that about 14% of our population depend for a living upon activities outside of production and manufacturing—in distribution. If the government continues to engage in business this group must either go on relief or upon a government payroll.—S. G. Hepler, Arrow Electric Co., Seattle.

tion, time-and-a-half for overtime work and they work at a rate per hour in most cases closely approaching the prevailing schedule in the community."

"We are able to take one look at our annual statement," says W. A. Hopper of Boise, "and realize just how fast we are being squeezed by government. Our volume was a few dollars better in 1939 than in 1938 but the net was only about 20% of the 1938 net."

Effects of Social Security

"Furthermore," says Clyde L. Chamblin, of San Francisco, "the government, both federal and state, has done many things during the past few years to increase the cost of doing business, which is, of course, passed to the ultimate consumer. Social security, old age benefits, unemployment insurance, sales tax and other forms of assessment, regardless of their merit, have all contributed to what the government calls the high building costs. Not only are the actual amounts of these assessments involved but the expense of accounting even in a very small business has been increased considerably by taxes."

That the reverse of what is intended is happening because of these taxes is set down startling by Frank Boyd of Oakland as follows:

"It seems to me that the growing burden of taxation by government is the most important problem before business. In our business, which runs between $350,000 and $450,000 annually, taxes of all manner and form in 1929 were about $1,700, in 1939 they were a little over $10,000 and in 1940 they are going to be in the neighborhood of $12,000. This is an increase of 750%. In the jobbing business taxes have increased four and one half times. The worst of the situation is that the taxes are still continuing to be larger each year. They are getting so burdensome it requires almost superhuman effort to produce enough business and sell it at a price that will bring in sufficient gross margin to pay the taxes, let alone make a net profit. This is actually discouraging management and causing owners and managers of business to seek ways and means to operate on a smaller scale. This is a trend which is certainly not going to contribute to the President's eighty billion dollar a year national income.

"It is my opinion that the social security taxes which are designed to raise funds for the unemployed and the aged are going to prove to be a greater creater of unemployment than automatic machinery. In 1935 and prior years we had no social security taxes; in 1936 my business paid social security taxes of $1,800; in 1937-8-9 they were $4,700 each year. If in 1940, we continue at the rate of the first four months our social security taxes will be $7,200. Before we are through they are going to cost 50% more than the present time.

"Management cannot continue to look at such figures and think in terms of increasing the number of employees. I have a feeling that we are going to see more and more organizations weed out unproductive white collar help and the older higher paid men. Another effect of the burden of taxation is going to be in making it ever more difficult for the less businesslike businessmen to survive. Social security taxes are different from all other taxes in that they have to be paid whether the business is operating in the black or in the red. We had a month just recently when we showed a loss of $2,700 and had to pay $600 in social security taxes for that month."

This would carry as logical conclusion that those businesses offering the best potential chance of employment would be affected most, too, he adds.

Another aspect is mentioned by Ralph Johnson, Sturgeon Electric Co., Denver. Price cutting among manufacturers is increasing since the Attorney General's office is investigating manufacturers and jobbers. "The result on our business," he says, "is that unscrupulous contractors are successful in bidding on projects and subsequently buy materials at their own price. Obviously this makes it difficult for legitimate contractors to operate under present market conditions."

Of the direct prosecution of contractors as a means of driving down building costs in the present anti-trust campaign, contractors have this to say:

The Prosecutions

"How is government affecting our business?" said Clyde Chamblin, "when the indictments of our group were first issued I would have replied, 'By destroying the public's confidence in our industry.' As these indictments have swept on however, I believe the public has changed its attitude and realizes that this is another manifestation of the government seeking power over local activities. In fact the public is outspoken in its sympathy for those who have thus been persecuted. As far as I can see this drive is acting as a boomerang for the government and has little if any effect on business. Temporarily prices may be demoralized due to the lack of inclination to enforce the Unfair Trade Practices Act, but I believe the worthwhile contractor will welcome the return of sane prices as soon as possible. I do not believe this prosecution will have the slightest effect on building costs.

"The hight cost of wiring, if it is high, is not the result of collusion of contractors or unions, but the inherent high cost of copper, brass and steel which comprises the materials we have to work with. And even if in some cities a group of contractors and unions may combine to frame a particular job or jobs, this should not brand all contractors and unions all over the country as illegal colluders."

The inconsistency of policy of the government plagues many. For instance, "Many small businesses, particularly in the construction field, have struggled for existence for the past decade. In NRA days they were told by the federal government that for their very existence they must organize themselves and create prices which would not be destructive. Also that their employees might benefit by such improved conditions, agreements should be made with labor organizations," wrote K. M. Ryals, of San Francisco.

"After the blow-up a few fundamentals of this noble experiment were grasped at by small businesses in hope that they might still be able to do something collectively toward making a better business. The theorists in the meantime have changed their minds and have decided that small business is entitled only to cut-throat competition and though no particular profit to anyone has ever accrued from all this unselfish effort which so many individuals of the industry have given with the hope of making better conditions

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If business would cooperate with government in carrying out its program as willingly as government has tried to cooperate with business, we would now be well on our way to recovery, but "No," because we are businessmen we just naturally acquire a superiority complex and throw up a smoke screen of ridicule and abuse accompanied by a considerable amount of buffoonery, and assume the attitude of the Two Black Crows—"Even if it was good, I wouldn't like it." There have been increased burdens to support government but that shouldn't be burdensome upon anyone. If I pay more social security taxes it indicates I have employed more labor, more sales tax, I have sold more merchandise, more income tax my income has increased.—A. L. Stone, Stone Electric Supply Co., Los Angeles.

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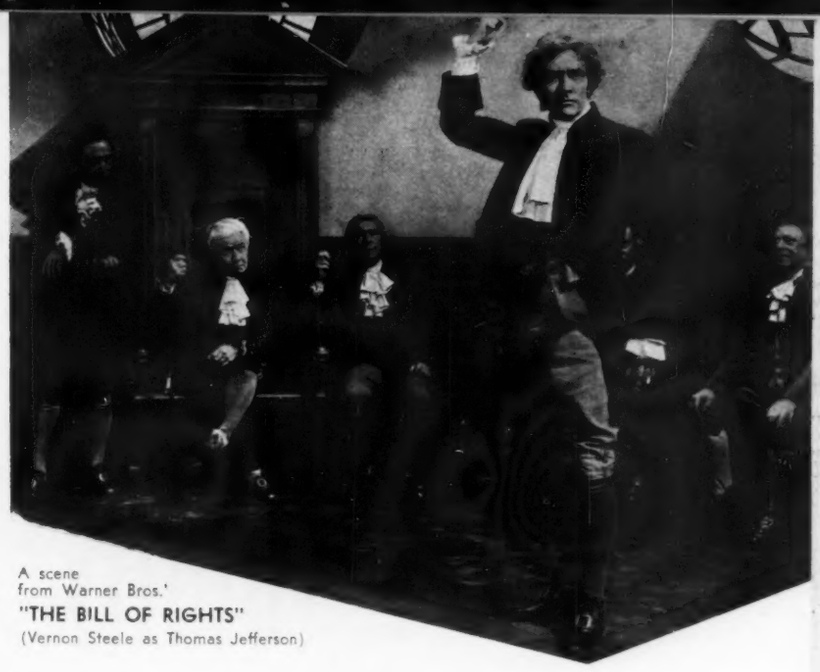
for all, the very effort itself is considered a grave offense and called restraint of trade. And of course it very handily creates another spoke for the administration, at the same time giving employment to a great number of struggling attorneys who could not possibly be otherwise employed. Of course, they will be a great asset to the political machine even though they must look to the people whom they seek to prosecute for their livelihood."

Ben J. Trowbridge of Medford, echoes the same thought. "There has to be some form of fixed prices in order to create a value. At one time the government favored the NRA which put in compulsory price fixing in direct contrast to the Sherman anti-trust law. Before the memory of NRA was cold it seems rather harsh to enforce the anti-trust law to an extreme."

Completely contrary viewpoint is expressed by A. L. Stone of Los Angeles. "We all know what has happened all the way from New York to Los Angeles—the most damnable labor rackets that man has ever conceived of have been thrust upon our industry, and our men, hungry to get more business without securing it in an open business-like way, have fallen prey to these racketeers. I know whereof I speak because I have seen it operate first hand and have opposed it from its very inception. It is due to this opposition that today our Los Angeles contractors are free from indictments.

"Personally I think the Attorney General's office is doing a swell job. No doubt a drive of such magnitude will enmesh some innocent victims but in the main, industry will benefit greatly by the cleaning up of these conditions."



A scene
from Warner Bros.'
"THE BILL OF RIGHTS"
(Vernon Steele as Thomas Jefferson)

The Bill of Rights

AMENDMENT I

Freedom of Religion, Speech, and the Press; Right of Assembly and Petition.

Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof; or the right of the people peaceably to assemble, and to petition the government for a redress of grievances.

AMENDMENT V

Protection for Persons and Their Property

No person shall be held to answer for a capital or otherwise infamous crime, unless on a presentment or indictment of a grand jury . . . . . nor be deprived of life, liberty, or property, without due process of law; nor shall private property be taken for public use, without just compensation.

AMENDMENT X

Powers Reserved to the States and the People.

The powers not delegated to the United States by the Constitution, nor prohibited by it to the States, are reserved to the States respectively, or to the people.

Lower Building Costs

As to its effects on wiring or building costs, V. R. Knight adds this to his comments:

"In house wiring today we are paying $10 a day for labor. The best a man can possibly do is to install 16 outlets per day, and none ever do. Our material will average from $1.35 to $1.65 per outlet. Sales tax, permit, social security and unemployment insurance added brings the average outlet cost to the contractor today up to a minimum of $2.21, a maximum of $2.51 for cottage work. The union contractor seldom sells these outlets for over $2.30 per outlet. In the majority of cases the contractor works with the tools himself, hires no men, and among non-union contractors we find them taking such work at from $1.75 to $2. Now contrast this with conditions in 1912. Knob and tube work outlets were selling for $3.50 an outlet, labor was $3.50 a day and the average man installed 20 outlets per day. Some change, isn't it?"

All agree that the real way to achieve some economy in wiring costs is by standardization, elimination of duplication in materials and fittings, better tools and organization. But even of this, Clyde Chamblin says:

"Of course it will help reduce costs, but for the regular run of jobs it seems to me that materials are pretty well standardized now. When you can buy switches and receptacles for 10 cents, how much farther are we expected to go? The electrical industry itself has made the rules under which our materials are manufactured and installed and if both of these costs are too high it is our own fault.

Complex Wiring Rules

"When installation rules are so com-

Liberal education of the last few years as to accomplishments in the realm of theory still leave me very much a realist. Had present day conditions existed in 1920, it is safe to say that our present organization would never have been started, for by comparison almost any relief agency of present day standards could have supplied a far better living for the first several years than we were able to wrestle out of this small, struggling business. And we are grateful, for tough as it was, the incentive created was fundamentally American and in its small way offered the same challenge and fostered the desire to succeed that has been the stimulation to millions of people who have made this the greatest nation on earth.—K. M. Ryals, Stone-Ryals Electric & Manufacturing Company, San Francisco.

plicated that no contractor, regardless of his years of experience, can install a simple job with any assurance of its passing inspection, and not even the inspectors themselves will take the responsibility of passing on anything but the most simple questions, there is something wrong with the direction in which we are headed. Any inspector who is not capable of telling whether or not a job is safe both mechanically and electrically, should not be an inspector. Laws and rules cannot possibly cover every condition, and the inspector should have the authority to pass a particular point when in his judgement it is safe. We of the industry are the ones who have made our work expensive. Maybe the hazards of electricity make it necessary, but when I see such quantities of it used under such extreme sub-standard conditions, I sometimes wonder if all the rules and regulations are really necessary or desirable."

As clear a summary of government moving in on business is contained in what S. G. Hepler, of Seattle, says as can be found. "Manufacturers, distributors, contractors, dealers, and union mechanics are going to awaken in the very near future and find themselves in the same boat with the utilities, discredited by the public, condemned by political opportunists, under investigation and indictment.

"The government entered the utility field mainly through such pressure groups as the Commonwealth Federation, political aspirants, the Grange. After some rotten spots were uncovered in the utility groups all utilities are now classed in the same category. The utilities of the past bulldozed, bullied or forced other branches of the industry to do their bidding and when the crucial moment arrived they had few friends and no influence—hence the rising tide of government in the utility field.

"Unfolding is another phase, the elimination of electrical material distribution systems. This is being taken over by certain national chains, aided and abetted by the government. This is indicated in a written and spoken address of Thurman Arnold, Assistant U. S. Attorney General, in which he freely states that certain national chains can and will, if certain restrictions are removed, do the distribution job for less. I wonder if manufacturers and distributors are viewing this trend with smug complacency or do they feel that they can outwit a situation having government backing, at the same time facing possible investigations and indictments? It is just not in the cards."

IN UTILITY SALES DEPTS.

UPON the sales department of the utility a tremendous responsibility has been placed during late years. The millstones of operating costs plus taxes on the under side, of rate reductions above, have ground down the percentage for net so fine that it has constantly challenged the sales department to the utmost to produce enough revenue to keep solvent. Utility men, burned by politicians who twist and turn every word against them, have only dared to speak anonymously in most cases. Psychologically they are "suppressed" in their freedom of speech already.

One who does speak and whose figures reveal the true facts so well, is D. B. Leonard, commercial manager, Pacific Power & Light Co. who says,

"No one can deny the fact that operating expenses are not reduced when rates are reduced, as our taxes, payrolls, and fixed charges and other items of operating expenses remain unchanged. The cost of power of course, increases as additional quantities are required and this indirectly affects distribution facilities which in turn is reflected in fixed charges, taxes and operating expenses. Therefore, all of the slack from reduced rates must come from additional kw.-hr. sales and our ability to reduce rates is in direct proportion to our ability to increase kw.-hr. consumption.

"Pacific Power & Light Co. this year is celebrating its 30th anniversary and we are preparing some charts which indicate progress of the type to which we refer with considerable pride. One of these charts will show the reduction in rates in effect when the company was first organized in 1910, as compared to existing rates today. In some instances the reduction has been as high as 79%.

"To be more specific, we can refer to more recent events when statistical information provides a more accurate historical record. In 1922 our residential customers on an average used 334 kw-hr. annually, which cost them an average of 8.94 cents per kw.-hr. The average revenue per customer was $30.75. In 1939 kw.-hr. consumption had increased to an average of 1606 kw. hr. and the average rate has decreased to 2.57 cents per kw.-hr., so the average was $40.78.

"During this 17-year period customers have gradually increased the expense item in their budget for electric service from $30.75 to $40.78, an increase of $10.03, or 32.6%. In this same period the amount of energy delivered for their use, based on the increase from 344 to 1606 kw.-hr., represents an increase of 1262 kw.-hr. or 367%. A tremendous increase in the use of service made it possible for the average rate to be reduced from 8.94 cents to 2.57 cents, which represents a reduction of 6.37 cents, or 71%.

"Obviously it would be impossible to reduce rates 71% if use of service, fixed charges and operating expenses remained constant. Therefore this historical progress has been made possible by one means alone—additional kw.-hr. sales. These additional kw.-hr. have made it necessary to expand facilities, increase the size of transformers, do an additional amount of accounting and billing, to the extent that cost of service to customers has increased slightly, but in terms of service delivered they are now getting 367% additional kw.-hr. for only 42.6% additional cost. To express it in another way, 71% reduction has been effected in the cost of electric service. Based on 1922 averages, our customers now receive $1 worth of electrical energy for 29 cents.

It appears to us that there is a regular hysteria with regard to "let the government do it." The best proof is that in 1930 we had 15 shops in this locality doing motor repairing and today there are only five. You will find most of these men working for the government and doing very well. In a kidding way, which is really more serious than we let on, we have asked them to make room for us, because if government continues to enter our business we would be better off working for the government and closing up shop. We would enjoy conditions that we do not enjoy today. With new taxes facing us every day and increased old taxes where are we headed?—V. R. Knight, California Electric Works, San Diego.

"Records of achievement of Pacific Power & Light Co. indicate that while substantial reductions were being made in cost per kw.-hr. material increases were experienced in the amount of taxes paid. Had it not been for taxes, in excess of $10,000,000 during the existence of the company, it is obvious that even greater decreases could have been made in the cost of electric service."

Another company, after telling how tremendous pressures have been applied to socialize the electrical industry in the Northwest goes on to say, "In the meantime we are going after business in every legitimate fashion to make up for rate reductions and to be ready for further rate reductions which we feel sure will follow any long term contract for Bonneville power.

"In the operating end the most rigid economies are being made effective so as to reduce in every way operating expenses and to place ourselves more and more in the position of a distributing company rather than a company generating and distributing power.

"If we can stave off public ownership until the public again is able to think straight, I for one, believe we can have still lower rates and still become a good operating company, rendering an excellent service which is appreciated by our customers. This is going to have to be done largely through the sales department and with the full cooperation of dealers and all other outlets for current consuming devices of all kinds.

"While we are having a tough time we are not downhearted, but if you had told us ten years ago that the federal government and other government agencies would edge into private busias they have done today we wouldn't have believed you."

From another section of the country comes this comment,

"No doubt the government activity over the last several years in the electrical business has had great and devious effects. In many ways it has greatly advertised and promoted the use of electric service and helped in building the electric load. However, there have also arisen some distorted ideas in reference to cost of service and rates."

In the recent PUD situation in Portland it is recalled that the federal government is already in the field of retailing power to the two large industrial plants (Aluminum Co. of America and Sierra Iron Co.) at Bonneville; that the administration of Bonneville is spending millions of dollars building transmission lines whose need is questioned, thousands of dollars of money collected in the form of taxes, some from the very utilities this money is spent to destroy; it has approximately 100 men on its payroll out speaking to audiences urging the formation of PUD's; has spread pamphlets, excerpts from the Congressional Record containing speeches by Harry Kenin, George Norris and others mailed postage free under the franking privileges of Congressman Pierce of Oregon and Senator George Norris of Nebraska; has had Carl D. Thompson, manager of the Public Ownership League of America on the Bonneville Administration payroll spreading propaganda against the industry. All in all, the federal government uses Blitzkrieg methods in its attack.

"If our business survives, it will be a miracle," says one defender of this Flanders Field of business. "If we are able to withstand the onslaught of the strongest propaganda machine ever built, it will indicate a very good state of public relations insofar as our own business is concerned."

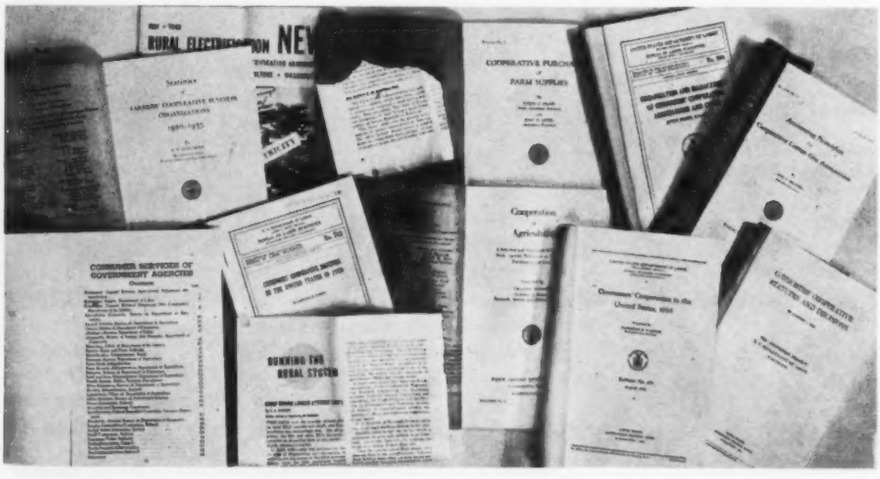
That the Northwest is not the only front for this attack is told succinctly by George T. Bigelow, general commercial manager, Nevada California Electric Corp.

"May I say that the government has spent $5,360,000 to parallel our lines, giving the Imperial Irrigation District $2,097,000 of this outright and charging only 4% on the balance. They are absolutely unable to buy our system as they have nothing to buy it with, and their sole intention is to put us out of business, throwing 123 people out of employment, ruining invested capital of millions of dollars, and thereby not giving one single thing new to the territory, in fact not giving the service to the territory which we are able to deliver.

"We have had four years of such competition now, and we find that it can be fought successfully only by giving the best of service and servicing, and conserving every possible penny. The real point is that this battle can be won.

"However every man who can and will think must know that such processes are wasteful, and every man who can and will think should use every effort to see that those who are fostering such practices are stripped of their office and power. Furthermore, this is not the fight of the electric utilities alone, but the fight of every business, whether large or small."

ROLL YOUR OWN—With tax money derived from business socially minded government bureaus write pamphlets and mail our literature telling the public how to start cooperatives and run them to eliminate private business and the chain of present distribution



Good public opinion and profitable customers result when people have pleasant experiences in their dealings with us. We know of no other way of creating good will than to demonstrate constantly that we and our service can do a better job than any one else. The question of to sell or not to sell is not determined by government competition or pressure. It is a recognized principle that successful selling is the life blood of successful business. Any business can survive only as a result of successful sale effort. This has been demonstrated countless times. Ours is no exception. We have not only tax free government competition but also the constant threat of other sources of cooking, heating and power.—C. Patrick Johnson, general sales manager, Puget Sound Power & Light Company, Seattle.

WHAT TOMORROW'S ENGINEERS MUST DO

THIS is an hour which engineers can take seeriously indeed. Questioning fingers point at the worth of the profession. Electric utility engineers can see other fingers pointing at the industry for which they work. And now engineers find these inquisitorial gestures illuminated in the sharp glare of a crisis which is shaking the entire world.

As one chief engineer puts it, it is a time when we are led to ask questions, "not only as to the future of private initiative in this country but as to the world future of free institutions and free men."

But the very multiplicity of these confusions may make it easier to see ahead. For this is a time when principles are stripped to raw bone, and underlying facts come into sharper focus. It is a time when "taking stock of ourselves" changes from a suggestion which was heard too often, and which seemed to have no real point, to a course of action which appears to be the natural, the "engineering" thing to do.

This is a logical time to figure out just what the utility engineer must do. What new difficulties face utilities? How can the engineer help out? How well is he equipped?

Let us first agree that there are new problems to be faced. Last month, ELECTRICAL WEST suggested to a number of chief engineers of Western power systems that it looked as though the necessity for operating successfully with lower rates and with new burdens of expense was likely to continue for a long time. There were no dissenting votes. One engineer said he thought this was "an understatement of the probabilities which the future holds."

It was also suggested that in meeting this and other situations, engineers might need to master new techniques. This brought several responses, as will be seen. Their tenor is exemplified in the words of O. D. Lanning, chief engineer of Eastern Oregon Light & Power, who wrote:

"I believe that utility engineers must recognize and face the fact that their job requires more of them than a sound technical training, used efficiently as a tool for doing their work."

In short, there is agreement in quarters of considerable authority and vision that there are new burdens which utilities must carry and new standards which engineers must meet.

It bears on the point in question to take some measure of just what engineers have got. The things which are suggested as engineering's next assignments are usually stated comparatively —engineers must "extend the application of this method" or they must "take on new responsibilities." All this obviously gives credit to certain functions which have already been successfully performed.

It is not necessary to look back many years to a time when there were no power lines at all. It is not much further to the time when—except for a few windmills and water wheels—the bulk of useful work was drawn from zoological prime movers of one rating or another. At that time there was little opportunity to practice the profession of engineering as we think of it today.

Here in a few generations there has been created a group of specialists with a generally acknowledged reputation for almost uncanny proficiency in their own field. The young engineer today steps into a full-fledged order. He senses at once that everyone assumes he has been schooled to astonishing integrity and accuracy, and he makes the assumption good.

He feels too that he has entered a worthwhile profession. He finds direct evidence of the good that it has done. He can count up shorter working hours and produce evidence of diminishing drudgery and find a direct relationship between these things and the work of his fellow engineers.

No profession enjoys more—perhaps none enjoys quite as much—popular respect for having done its own job well. Why than should a shadow fall on a group with such an unmarred record of success?

Perhaps the answer is to be found in a utility public-relations department, which has as its first rule: "Keep the eengineers away from the customers at all costs."

And perhaps the reason for that rule stems from the fact that an engineer practices his art upon inanimate objects. Inanimate objects do not talk back.

It is probably true that this criticism is exaggerated. But it has sufficiently wide acceptance to deserve some serious thought.

By way of review, it was agreed that new cost burdens face utilities. There appears to be evidence that engineers exert less influence on people than they might. How are these things hooked up?

Utility costs become a "burden" when there isn't enough income to cover them and provide enough profit to maintain the unit as a going concern. Income varies with rates charged for the service. And rates are conditioned partly by what the customers think they ought to be.

Now the customer does his "thinking" on the basis of whatever information or misinformation happens to come his way. It follows, therefore, that if an engineer could satisfactorily articulate the basis of electric costs, the customer who heard him would have a sounder basis for judging his own rate. An engineer might thus become the direct means of dissolving some of the confusion in the public mind.

Mr. Lanning throws another light on this point as follows:

"To a large degree the problem of securing and maintaining good public relations simply requires, first, securing facts, and then, following up with pa-

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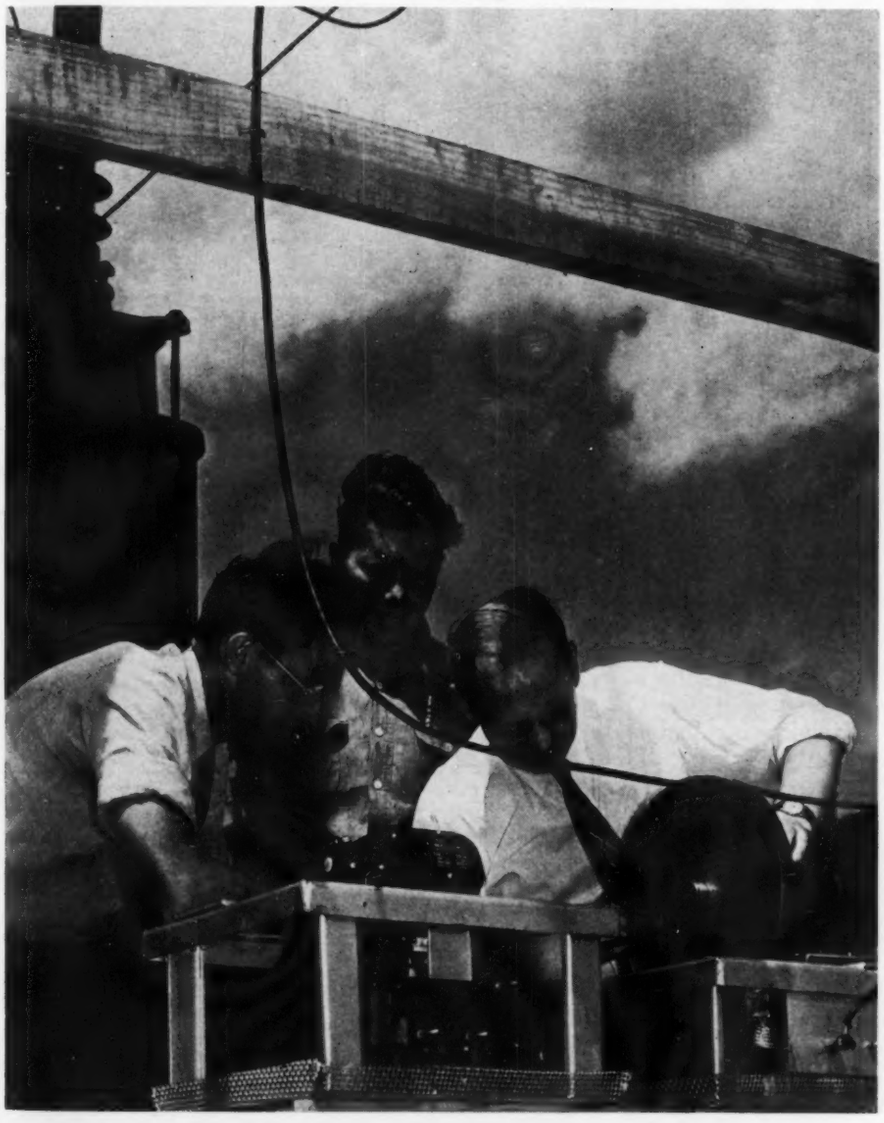
"Utility engineers must recognize and face the fact that their jobs require more of them than a sound technical training used efficiently for doing their work. Such training has forced on them the ability to distinguish facts. To a large degree the problem of securing and maintaining good public relations simply requires, first, securing the facts, and then following up with patient, tolerant explanation of their meaning. The practice of patience and tolerance will enable the engineer to extend the benfits of the respect which he has won for his profession."—O. D. Lanning, chief engineer, Eastern Oregon Light & Power Company.

tient, tolerant explanation of their meaning. The general respect which the engineering profession has rightfully earned gives an engineer assurance of favorable attention to his word."

These points which swing around the general nucleus of public relations represent only one cluster in the larger group which thoughtful engineers men-



tion when they contemplate the engineering of tomorrow. But all the points involve a shift in outlook. It is to the effect that the engineer can no longer view his work as a problem in which personalities are not involved. For instance:

"In my opinion the engineer cannot continue to make a fetish of perfect service but, instead, must concentrate upon the problem of giving reasonably good service with lower construction and operating costs. Of first importance is that the viewpoint of the engineer be such as to keep the factors of service and cost of rendering service in an economically sound relationship."—R. H. Halpenny, electrical engineer, Nev-Cal Electric.

It is obvious that "reasonably good service" requires the engineer to make a definition which takes in human factors.

"It is necessary to avoid extensions on too optomistic a basis. If load growth can be predicted with a reasonable degree of certainty, the capacity for the future should be supplied, but the adding of large amounts of excess capacity just on hope is often a losing proposition."—O. L. LeFever, general superintendent, Northwestern Electric.

"With rapidly changing conditions in the production field, system operating economy is obtained through cooperation with governmental projects in the distribution of energy and through interconnection with other systems for interchange and standby." — Walter Brenton, chief engineer, Portland General Electric.

Need it be pointed out that "hope," "optimism" and "cooperation" are to be found in no engineering formulas?

The foregoing quotations might well be read twice, for they not only illustrate the human elements which are edging into the engineering field but also set forth distinct views concerning the engineering of tomorrow. Everyone emphasizes the increased reliance which is being placed upon engineers to meet the new obstacles of cost. As. Mr. LeFever says:

"The solving of a majority of our problems will require the same application of logic used in the solution of engineering problems which have confronted us in the past."

What it all means is that engineers are expected to continue the first-class performance of the past, despite the increasing complexity of their field, and at the same time to enlarge their definition of their field to include proficiency in what heretofore has not been regarded as engineering work at all.

As to those pointing fingers which accuse the engineer of failing to solve the problems his machinery has brought about, there is the faint suspicion that the pointing endeavors to direct attention away from a failure somewhere else.

But engineers accept that challenge and are now moving into new fields. They approach tomorrow's engineering on a record of success.

"Private enterprise has been the moving spirit in our country from its very beginning and by private enterprise we shall go forward. Government cannot by edict create an Editon or a Steinmetz. Genius is nurtured by private enterprise. It grows under the fierce light of practicability and competition in the open market, where its work is examined and accepted. Every engineer—every citizen—has a stake in free enterprise in this country. Because it is only through free enterprise that America can go ahead." —J. E. E. Royer, vice-president and general manager, Washington Water Power Co.

Leisure House

Southern Calif. Edison extends broadcast to Visalia

Southern California Edison Co., after a Santa Ana test of "Leisure House," the recorded radio program which 20 utility companies and appliance groups have broadcast in various parts of the country during the last year, has extended the series to Visalia.

"Leisure House" is broadcast two mornings each week, and each broadcast is individually sponsored by an electrical appliance dealer, with Edison merely joining in a friendly greeting to the lady listeners. Dealers and radio stations report that the program is generally popular and proving a source of good will for all concerned.

City Light in Seattle also began broadcasting "Leisure House" over KOL during May, and sales are said to be pending in other western utility centers.

Of interest to Pacific Coast and western broadcasters is the fact that Tampa Electric Co., which pioneered with "Leisure House" a year ago, and whose advertising manager, F. J. Lacey, fathered the entire "Leisure House" idea, has been notified that it has been awarded the George A. Hughes trophy for "the greatest contribution to the sale and promotion of electric cookery" during the last year. "Leisure House" was an important part of Tampa Electric's 1939 merchandising program, and it helped to increase range sales 69%.

Water Heaters

Special trade-in allowance given by Inland Empire Assn.

Members of the Inland Empire Electrical Equipment Assn. have found an added incentive to water heater sales in the special trade-in allowance on flat-rate water heating equipment now promoted by The Washington Water Power Co.

In selling an automatic electric water heater, that replaces a flat-rate heater now in use by a utility residential customer, or in any detached or duplex dwelling, dealers participating will allow the customer $15 for the old equipment. The utility will allow $7.50 to the dealer for every sale made under these conditions by dealers who actively sell and display automatic storage-type water heaters.

In all cases, the utility will remove the flat-rate equipment, and installation of the new heater will be made for a fixed charge.

Humor is being used by the Inland Empire Electrical Equipment Assn. in a series of newspaper advertisements "selling" small appliances

Her coffee would be grounds for divorce in any family! Too bad she didn't know that coffee is always uniform, better-tasting with an electric coffeemaker! Brews coffee automatically and economically. Easy to clean, easy to use. Select your coffeemaker today.

INLAND EMPIRE ELECTRICAL EQUIPMENT ASSOCIATION

Home Service

Conference recently concluded in Helena, Montana

Stressing the greater need for utility service in its relation to the American standard of living was the theme of the three day Home Service Conference recently concluded in Helena. Meetings were held in the electric kitchen of The Montana Power Co. in Helena.

Highlighting the meeting were two out-of-state guest speakers, Miss Nancy Finch, Director of Home Service, The Utah Power & Light Co., Salt Lake City, Utah, and Walter Potter of the Incandescent Lamp Dept., General Electric Company at Portland. Miss Finch spoke at length on the importance of homemaking and the contribution electricity has made and will make to the American home. Potter, a lighting expert, entered the girls' own field by showing the lighting effects to be obtained through combination use of modern lighting equipment.

Other speakers were J. R. Kaiserman, Division Manager, Helena, and J. C. Ryan, R. O. Kerr, D. J. McGonigle, S. P. Hogan, and R. E. McDonough of the General Office of the company.

Sixteen girls were in attendance at the meeting. The arrangements for this gathering was made by Miss Dorothy Stewart, Home Service Director, and Mrs. Afton Saxton, Home Service Advisor of Helena.

Mr. and Mrs. J. R. Kaiserman entertained the group on Tuesday afternoon with a cocktail party at their home, after which a banquet was held in the Montana Club with D. J. McGonigle, General Sales Manager of the company, as host.

Future Campaigns

Utilities and bureaus outline their campaigns to come

Scheduled for June and July are some important programs, both from an advertising and a promotional standpoint, concerning the major appliances. Ranges especially are being highlighted in these mid-summer drives for more sales, and more dollars in everybody's pocket.

Brit. Columbia Electric Railway Co., Ltd.—Continuation of range, water heater and refrigerator activities for June and July. June Bride gift sale stressing traffic appliances and lamps.

Idaho Power Co.—Electric water heater campaign continues through June. Advertising will run until the 15th of June, when the company will begin to feature water heating and electric cooking for the remainder of the month and through July. The Idaho Power Kitchen Coach started its annual summer activity in rural communities in May. Special equipment shows and demonstrations were conducted by the company. Starting in July, commercial activities will feature air conditioning and ventilation. Also scheduled in June are several re-wiring meetings with building owners, managers and architects.

Los Angeles Bureau of Power & Light—Electric range campaign for June. Home show and dealer expositions to be held. Electric range sales trip to Catalina Island contest.

Nevada-California Electric Corp.—Range campaigns for June and July.

San Diego Bureau of Radio & Electrical Appliances—Refrigeration and table appliances for June. Refrigeration recipe book is being issued in June.

Seattle City Light—Automatic electic water heating and commercial electric cooking campaigns for June. Weekly cooking schools using equipment handled by dealers conducted in June. Automatic electric tanks installed for $15, this price being extended to all dealers.

Southern Colorado Power Co.—Range and water heater campaigns for June.

Utah Power & Light Co. & Subsidiaries—Table cookery, roasters, hot plates and refrigerator campaigns for June and July.

Washington Water Power Co.—June: "Winning the Bride" residential range and water heater campaigns.

● ADVERTISING MOVIE FILM SHORTS, in color, used throughout the United States, are produced in the West. Over 700 electric appliance dealers are furnished such advertising short films by the manufacturers on a cooperative basis. These film shorts are made at Colorado Springs, Colo., by Alexander Film Co. which has built up a large organization for this special type of movie production. Among the features filmed there are the recent Frigidaire series, a series for General Electric dealers and another for Westinghouse dealers. The photograph on the March cover of ELECTRICAL WEST was from such a movie taken in the electric kitchen of the Southern Colorado Power Co. at Pueblo, Colo., for the General Electric Co.

Customer Service

New bureau established by Utah Power & Light

Designed to promote a closer relationship between company and customer, and to overcome the tendency for business, as it grows, to become impersonal and lose its neighborly touch, the Utah Power and Light Co. has recently formed a new department, the Customer Service Bureau.

Thirteen experienced men were selected from the company personnel last January to make up the new department and under the direction of Olin H. Ririe, assisted by H. M. Ferguson, were put through an intensive training program. All phases of the company's business and activities were presented and discussed by company officials and department heads following a general outline of the program which was presented by George M. Gadsby, president and general manager and Dr. Adams S. Bennion, assistant to the President.

In calling on the customer, the representative has a frank discussion with the customer of his electric service, his attitude toward company policies and what the utility can do to help him. Every question is answered in a straightforward and friendly manner. His service bill is analyzed, his complaints and requests for additional service are referred to proper departments and he is given full opportunity to become acquainted with the extent, adequacy, value and cost of service.

Although those who are directing this work do not yet draw specific conclusions, they find that these interviews have produced a wealth of interesting and informative data and at the same time have revealed a need for just such a program. C. A. Wolfrom, Salt Lake division manager, says:

"Judging from the reports made thus far, and from responses and statements of our customers, it appears certain that the program will become a very worthwhile activity. The confidence shown by the customers in freely discussing their attitude toward the company with employees in this department is very encouraging, and is in a large measure the result of the friendly attitude of those who have been selected to carry on this program.

"Unquestionably the opportunity provided our customers of clearing up misunderstandings and complaints, which in some cases have not been satisfactorily taken care of, is welcomed by our customers and certainly by the company."

For the present the activity is being confined to the Salt Lake Division. It has received close supervision and guidance from Ririe who outlined the program and placed it in operation. According to figures which he has compiled, a total of 544 interviews were completed between Feb. 7-23, date of the first progress report. While this work is definitely divorced from sales effort, the interviews have resulted in appliance repairs and parts replacement orders, arrangements for Home Service department demonstrations in the home, requests for information on adequate wiring and future orders for refrigerators, ranges, water heaters, etc. Ririe says that information has been supplied and false impressions corrected in answering questions involving the following: Territory served by the Utah Power & Light Co. and other utilities in Utah, regulation by Public Service Commission and other government agencies, executives' salaries, rate comparisons, taxes, service rendered eastern connections (E. B. & S. Co., etc.), stock dividends and price, how to figure monthly bill, how to read electric meter, accuracy of meters and honesty and willingness of the company to cooperate in adjusting complaints.

Spring Fair

Like perennial spring flowers, San Diego blossoms in its annual electrical fair at Balboa Park under the nursing of that master gardener, the Bureau of Radio and Electrical Appliances. Head landscape architect is J. Clark Chamberlain, secretary manager, and the dealers and distributors of San Diego county fill the former world fair building with the flower of electric appliances for the public of San Diego to see.

These fairs have been going on twice a year for a long time. They are reduced now to a simple formula. It still works. This year its crowds were ahead of last year, and last year taxed the capacity of the building. Sales from the show were reported to be better also, and the show gave refrigerator dealers a break—they were able to show higher priced models to better advantage and get away a little from the price war.

Crowds divided their time between watching the action at demonstrations of appliances and floor show attractions and prize drawings. The utility featured light conditioning, contracting "old and new" room lighting switched on alternately.

ACTION everywhere, with interested crowds to watch demonstrations, characterized the Spring Fair in San Diego, April 30-May 4. Pictures show dishwasher, ironer, washing machine and vacuum cleaner demonstrations, the latter lifting of the vacuum cleaner by the suction of its own motor. Action there was, too, in sales following the show, sales reports now indicate

Group Thinking

Washington Water Power keeps tab on its advertising

Group thinking is proving its value in the Washington Water Power Co.'s advertising program, according to Kinsey M. Robinson, president, who recently initiated the monthly conference plan to include all department heads.

The Washington Water Power Co. has in its advertising budget something over $100,000, and not only does the conference plan assure greater value from budget expenditures, but open discussions help to determine desirable policies regarding dealers and the customer. Then, too, monthly sessions keep departments which normally have little contact with load-building activities fully informed on sales promotions as well as on institutional projects.

The conferences are held at the same time each month, and department heads or representatives of the department are invited to attend. Discussion is conducted under four headings:

(1) *checking results:* comments and observations are made regarding advertising that was run during the past month. Were newspaper ads seen and were they effective? Were billboards weak or strong? Did the copy bring unfavorable reaction? Were radio programs directed to reach the company's objectives? What might have been done to improve any specific form of advertising?

(2) *planning:* institutional and merchandising programs proposed for future adoption are discussed as to how coordination may be best effected between the sales promotion and other departments. Recommendations are made regarding advertising themes, media and novel promotion methods, etc.

(3) *recommending policies:* such questions as involve merchandising practices, media, employe participation, and customer relations are discussed pro and con with recommendations made to the management for action.

(4) *preview of advertising:* suggestions and ideas that were made at a previous conference, and which had been worked out by copy man and artist are briefly previewed. Institutional copy is read, and accuracy of statistical data, etc., is checked by rate expert, engineering, accounting and customer representatives.

The conference meetings, states Robinson, are always attended. Department heads, while they do not claim to be trained in the mechanics of layout, copy writing and illustration, do have, after years of contact with the company, a keen insight into policy matters. Furthermore, the average man's viewpoint often serves as balancing agent when expressed regarding innovations in sales promotions and advertising.

And what does the advertising department itself think of the conference plan? While some uncertainty may have existed before the plan was tried as to whether interminable and fruitless discussion might result, the first meetings dispelled this apprehension. Carefully regulated, the conferences can definitely contribute sounder policies, new ideas and cooperation between all departments in the advertising and promotion of customer relations and advertising.

Window Display

Electric Appliance Society names campaign winners

Winners of awards in the window display contest conducted recently by The Electric Appliance Society of Northern California in conjunction with the 1940 Electric Refrigerator campaign have been announced. First prize in district one went to C. D. McLaughry, H. C. Capwell Co., Oakland; 2d prize a tie between Chas W. Davis, O'Connor, Moffat, San Francisco, and H. L. Dasteel, Nathan-Dohrmann Co., San Francisco.

District two first prize was awarded to J. J. Ralph, Brenner's Sacramento; 2d prize to P. S. Gallagher, Hale Bros., San Jose. District three top prize went to R. W. Mitchell, Empire Electrical Shop, Santa Rosa, and 2d prize to J. D. O'Connor, O'Connor Hardware Co., Red Bluff.

Cooking School

Ritzville, Washington electrical dealers are attempting something new in the way of cooking schools. The Ritzville Trading Company, Ott Motor Company, Ritzville Drug Company and the Snyder Electric Company of Washtucna, Washington, are holding a cooperative cooking school in Ritzville early in May. The dealers are sending out private invitations to all the prospective REA customers as well as regular utility customers in the district. Margaret Saunders, home service adviser with the Washington Water Power Company, will conduct the school.

● PROFITS from Palo Alto's municipally owned electrical system made it possible during 1938-39 to transfer $139,026 from the electrical department to the general fund. This marked a new high surplus in electrical earnings by the city.

Bricks

Hotpoint introduces novel sales drive in "Brick House"

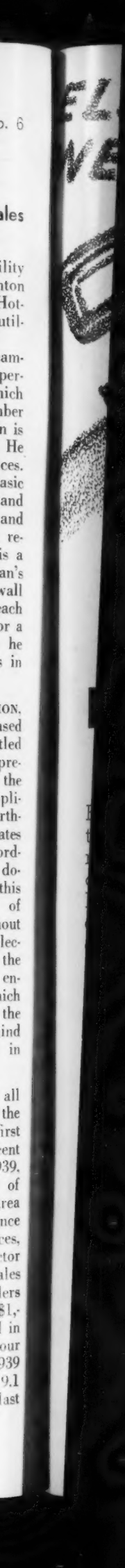
A clever spring and summer utility selling campaign, issued by Clinton Brown, campaign manager for the Hotpoint Co., is making bricklayers of utility appliance salesmen.

It is called the "Brick House" campaign, in which every appliance or percent of quota is a brick in a house which will require a predetermined number of bricks to complete. Each salesman is assigned a section of wall to build. He lays his "bricks" as he sells appliances.

Hotpoint has made available a basic plan book, using amusing artwork and copy which can be rearranged and adapted to the individual utility's requirements. Included in the book is a double page for use as the salesman's score card. It shows his section of wall containing one hundred bricks, each representing one percent of quota, or a certain number of appliances. As he makes his quota, the salesman fills in his "bricks."

● TOASTMASTER PRODUCTS DIVISION, McGraw Electric Co., has just released a 15-min. sound-slide film entitled "Smother Sale-ing" to its sales representatives. This film, to be shown to the retail sales people of electrical appliance departments, picturizes worthwhile selling ideas and demonstrates the value of their application. According to W. E. O'Brien, Toastmaster's domestic appliance sales manager, this film was prepared on the basis of studies and surveys made throughout the country on the retail sale of electrical appliances. Those who view the film are also given a small booklet entitled "Step Up Your Volume" which is based on the material given in the film, and which serves to call to mind the selling principles demonstrated in the picture.

● SALES of electric appliances by all dealers in the territory served by the Utah Power & Light Co. in the first four months of 1940 were 9.3 percent above the corresponding period in 1939, due to improved purchasing power of the consumer in the intermountain area and a more general public acceptance of labor-saving electrical appliances, according to W. E. Fleetwood, director of dealer coordination. A total sales for the four months by all dealers reached $1,789,674 compared with $1,638,463 in the corresponding period in 1939. Refrigerator sales for the four month period were 67% ahead of 1939 and water heater sales increased 9.1 percent over the comparable period last year.



PRINT IN BINDING

ELECTRICAL WEST

SALES GUIDE

Never Mind the War, Roaster Time's Here

Everywhere in this land of the still free Electric Roaster drives are starting. That's better news than any you read about of other sorts of drives across the various oceans. For a Roaster drive means business to a dealer and salesman. And you **can** do something about a Roaster campaign; you can get into it and make your own gains.

National advertising big shots are booming away at sales resistances for you. Utilities and manufacturers are firing away with more local publicity on Roasters. You do the mopping up of sales and profits. Line up with your distributor for supplies and sales ammunition and—forward march.

Your objectives are easy to reach. First come all the women who do not have an electric range and who would like to cook comfortably and easily all summer. Even those with ranges can use one for a spare, for outdoor entertaining, picnics, to serve buffet style, or for extra large dinners where the regular oven is not enough.

Apartment dwellers are another sector you can take. A Roaster requires so little space, yet does so many kinds of cooking. Folks who own summer cabins at a beach or in the hills, and owners of trailers are the last outpost. They can be had too, when you show how a Roaster simplifies cooking so that they have more time for play.

ROASTERS

JUNE 1940

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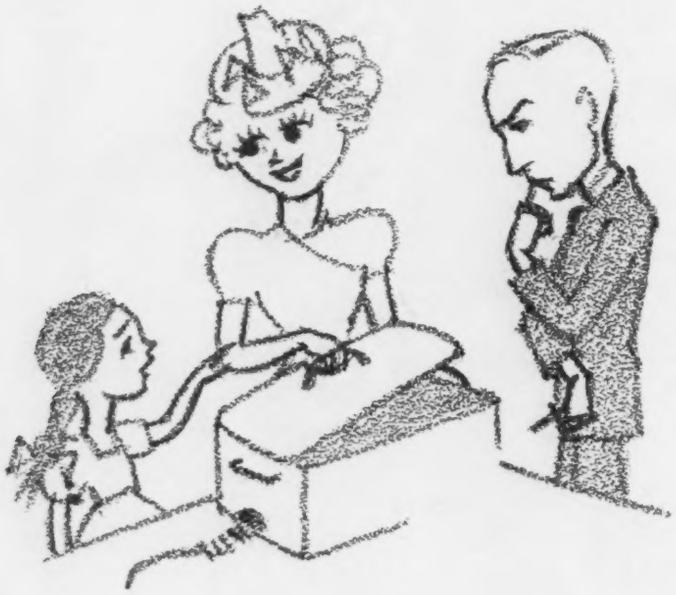
OH, BY THE WAY—



What to do when

1. You're interrupted.

2. She's "just looking"

Both are common difficulties in floor sales experience. Since roaster sales are made chiefly from the floor, what to do about these two problems is vital to success in selling of Roasters. The ideas involved, though can be used to handle the same problems with other appliances.

Interruptions when you are giving your sales presentation are pretty aggravating. They slow you up or let your customer's enthusiasm cool down. They interrupt your own line of thought and it is easy to repeat yourself in trying to get back to where you left off.

Causes of interruptions on outside sales may be due to selection of wrong time and place to tell your story. On the floor the cause may be wrong placing of the merchandise in respect to floor traffic, or inadequate help or thoughtlessness.

1. Cure for interruptions can be found first in arranging the display from which you make your sale in a place where you will be less interfered with by floor traffic. This is a ticklish problem because you want Electric Roasters in the line of traffic in order to stop prospects. Where possible, put an active demonstration near the line of traffic to attract attention and stop the prospects. But arrange the stock of Roasters just off the main line where you can take the customer to close the sale. It is wise to have a few toys and a place set aside for children so that they will not interfere during your discussion. Then, if you are interrupted, reopen again with some new sales benefit point. "Oh, by the way, did I mention this—" (There is a list of these points on the last page.)

SUGGESTED BY

This may be elementary — but if so, why do so few salespeople do it?

Just lookers may fool you. They may be really interested and merely a bit gun shy. When one comes in and asks just to look around, don't take it for granted that she is not interested. Many a salesman has lost a customer for good by showing disappointment or disgust or disapproval to the prospect who comes in to look. It pays to be pleasant about it and welcome such a person. One bookstore man made a successful business by inviting people to "come in and browse around."

2. Every one who comes in, tell yourself, may some day be a prospect. In fact she may be one now with a little help. If you take the attitude that you will gladly talk to anyone who will listen about the Electric Roaster you won't overlook any bets. Even if the prospect says that she has one or has just bought a competing model, it pays to ask to show the features of yours, because she may buy the next appliance from you or send friends to you. Be tactful with the person who comes to look around. Don't force yourself. Let her alone if she wants to be, but be handy to answer questions or show details. When she does not object, go along with her, explaining the **meaning** of details **to her.** In other words every mechanical feature is supposed to mean something to her in added convenience or wear. Find out what it is and talk to her in terms of that service or convenience. This will stimulate interest. Often it permits you to go on and present all the sales reasons and to make the sale.

(For the Electric Roaster you'll find all the general advantages listed on the next page. Translate any specific feature of your own line into similar terms.)

YOUR SALES ALLIES

PUGET SOUND POWER & LIGHT CO. • WASHINGTON WATER POWER CO. • PORTLAND GENERAL ELECTRIC CO. CALIFORNIA OREGON POWER CO. • UTAH POWER & LIGHT CO. • IDAHO POWER CO. • THE MONTANA POWER CO. ROCKY MOUNTAIN ELECTRICAL LEAGUE

HERE'S AN IDEA

Best tools you have for selling are the low electric rates that are now available to customers of yours. It only costs half as much to operate appliances, such as a roaster, these days as compared to a few years ago. These low rates can be used regularly and profitably. If you aren't familiar with them, ask your utility.

Take advantage of the traffic that comes to fairs and expositions—be there to demonstrate and to sell.

Cool cooking in summer. Insulation keeps heat inside, just as in an electric oven.

So clean and easy to keep clean. Under controlled temperature foods do not burn on utensils. The shell can be washed with the dishes; exterior wiped with a damp cloth. Electricity is as clean as electric light, can't smudge the walls.

Cooks better because it saves flavors and mineral juices which bring good taste.

Take it anywhere, to picnics or to summer cabin or on vacation trip. Bring warm foods to church socials, etc.

Serve right at the table from it. It is attractive, keeps second helpings warm. No need to leave the table and guests.

Attention free. Can even cook while you shop or attend to other things.

Space saving, ideal for small apartment or kitchen.

So many uses possible — long cooking of cereals, soups, roasts — deep cooking of doughnuts, french fries, etc. Fine for canning, or sterilizing, keeping hot packs hot—serving meals to invalids.

DISPLAY

Make the most of summer opportunities by displaying roasters prominently. First in the store windows, attractively and with change in arrangement often. Then inside, display near the traffic line. Display where hundreds of your customers can see—in newspapers or shopping news or direct mail.

DEMONSTRATE

Delicious and appetizing odors wafting to the nostrils of people passing by—one of the oldest and surest attention stoppers. Hunger is something that everybody experiences. These aromas virtually "lead them by the nose" to your demonstration of roasters. Three practical and business developing ideas for demonstrating are: 1. In the store —either all the time or on special advertised days. 2. At a prospect's or a customer's home—inviting friends in for bridge while you prepare the meal—the aluminum selling idea. 3. At women's clubs, or church groups—use roasters to prepare the refreshments in exchange for an opportunity to give a short sales talk to them. If you can, give everybody a chef's cap or apron. Where to get demonstrators? Many former customers can be persuaded, often times, to come to the store and demonstrate for a few hours to earn extra pin money.

YOU MIGHT TRY

COMMITTEE REPORTS

Northwest Electric Light and Power Association

1939-40

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Business Development Section*

Introductory Statement

THE Business Development Section set up its organization at a meeting of the Advisory Council in Seattle, Sept. 7, 1939. Here the Section completed its organization into Bureaus, set a tentative date for the annual Section meeting and authorized another annual Commercial Cooking Conference.

The Fifth Annual Commercial Cooking Conference was held at the New Washington Hotel, Seattle, Nov. 2 and 3, 1939, under the chairmanship of J. A. Lockhart, chairman of the Commercial & Industrial Sales Bureau. There were 59 delegates present from 10 member utility companies and 16 representatives of nine manufacturers, jobbers and advertising agencies, about the same number as attended the previous year. Sessions were held mornings and afternoons of two days, and subsequently a mimeographed report of the Conference discussions was issued. As usual a $2 registration fee was charged to cover the incidental cost of the meeting and the production and distribution of the conference report.

At this meeting prizes were awarded to the winners in the 1939 Data Sheet Contest for the best commercial and industrial heating data sheets turned in during the year. These prize winners were first, J. E. Dugan, Puget Sound Power & Light Co.; second, Lloyd Steele, Puget Sound Power & Light Co.; third, W. R. Reed, Idaho Power Co.; while honorable mention went to D. S. Bailey, Idaho Power Co., and D. O. Bergey, Northwestern Electric Co.

Also at this conference a committee was appointed to set up the plans for the 1940 Data Sheet Service and the first data sheets in the 1940 series were issued in March.

The 15th Annual Meeting of the Section was held at the Olympic Hotel, Seattle, Feb. 29 and Mar. 1, 1940, with C. Pat Johnson, Puget Sound Power & Light Co., acting as chairman.

This year the meeting was cut from two and a half to two days with general sessions on Thursday morning and all day Friday and with five bureau and committee conferences Thursday afternoon.

The general sessions were replete with talks related to sales and promotional work and load building by industry leaders. An innovation in reporting the results of bureau and committee conferences to the general session on Friday was introduced this year by having these reports delivered from a public address system in the style of radio news flashes interspersed with fake commercials in humorous vein. This method helped greatly to streamline the meeting and to lighten it with comic relief. The following committee ably conducted this part of the program: C. E. Hess, W. B. Bonnett, and George Rideout from Puget Sound, and Grant Merrill of Strang & Prosser advertising agency.

The theme of the meeting was "Home Coming for Old Timers" and a number of men formerly prominent in the industry in the Northwest but now active in the industry in other parts of the country had been invited to attend. In addition, all the past presidents of the Association were invited. This "old timers" theme was featured particularly at a dinner in the Olympic Hotel Thursday evening. Here several past presidents, visiting "old timers" and executives of the Northwest utility companies gave brief talks, and messages from certain absent ones were read. Frank McLaughlin, president, Puget Sound Power & Light Co., presided. The "Dog House" was again in operation, this time at the Washington Athletic Club under the chairmanship of F. T. Brien, Graybar Electric Co. Henry R. Kruse, Puget Sound Power & Light Co., was chairman of general arrangements.

In the following pages are printed extracts from or abstracts of most of the talks made at the general session and all the formal papers presented at the bureau and committee conferences. Below is a resume of the talks made at the general sessions that for one reason or another are not printed more completely with the reports.

At the opening of the first general session Mayor Arthur B. Langlie welcomed the group to Seattle. He spoke briefly on the necessity for a high type of leadership in city government and emphasized the necessity of marshalling our natural and human resources and putting them to work. He was followed by a welcome on behalf of the electrical industry by Samuel P. MacFadden, vice-president, Puget Sound Power & Light Co. MacFadden took this occasion to outline the controversy between various PUDs in the state of Washington and his company, in which the PUDs sought acquisition of the company's properties. He read letters passing between the PUD organization and Frank McLaughlin, president of the company, that made clear to the delegates the present status of the situation, in which the company stated it would not negotiate with the PUDs separately for the sale of the properties piece-meal, nor would it negotiate with a PUD organization for the sale of the company in its entirety until the PUDs evidenced good faith by dropping their condemnation suits now pending in the Washington courts. MacFadden stated that the forces of government ownership as expressed through the PUDs were trying to drive the private utilities from this state. The situation presents a real challenge to the salesmen, he said. We must have still lower rates and still greater use, which means more intensive selling and promotion of utility service and appliances to utilize that service. We also need more industries and our next job should be to speed up the industrial development of the Northwest.

In the balance of this opening session, the delegates heard a response by J. E. E. Royer, president of the association, printed herein, and an address under the title "How and When Will the Job Be Done?" by V. H. Moon, vice-president, General Service Corp., Chicago, former Northwesterner with Pacific Power & Light Co., which is published in the April issue of ELECTRICAL WEST, page 27, under the title "More Net Revenue for the Utilities."

The Friday morning general session heard the report of the Residential Sales Bureau under the direction of J. F. McAllister, Utah Power & Light Co., chairman. It consisted of reports from the Home Modernization Committee by F. M. Ingraham, Idaho Power Co., chairman, and of the Home Service Committee by J. B. Buman, Northwestern Electric Co., chairman. In connection with the Home Service Committee report Ralph E. Gale, Idaho Power Co., talked on the "Value of Home Service Programs to the Utility" published herein. Also at this session was heard an address on "Markets and Forecasts" by A. H. Jaeger, Edison

* Advisory Executive Council: C. Patrick Johnson, Puget Sound Power & Light Co., chairman; D. B. Leonard, Pacific Power & Light Co., vice-chairman; chairman, Commercial and Industrial Sales Bureau, J. A. Lockhart, Pacific Power & Light Co.; chairman, Residential Sales Bureau, J. F. McAllister, Utah Power & Light Co.; chairman, Rural Sales Bureau, John C. Scott, Puget Sound Power & Light Co.; chairman, Advertising Bureau, John Dierdorff, Northwestern Electric Co. B. C. Electric Railway Co.: W. C. Mainwaring; California Oregon Power Co.: Glenn L. Jackson; Eastern Oregon Light & Power Co.: LeRoy A. Grettum; Idaho Power Co.: Ralph E. Gale; The Montana Power Co.: I. L. Comstock; Mountain States Power Co.: Harold E. Farris; Northwestern Electric Co.: George H. Wisting; Portland General Electric Co.: A. C. McMicken; Utah Power & Light Co.: W. A. Huckins; The Washington Water Power Co.: Lewis A. Lewis; Edison General Electric Appliance Co.: J. C. Platt; Hurley Machine Co.: R. G. Chamberlain.

General Electric Appliance Co., Chicago, which is published herein, and a humorous talk with demonstrations entitled "Gadgets Will Get You If You Don't Watch Out," by William A. Cyr, ELECTRICAL WEST, San Francisco.

On Friday afternoon the Rural Sales Bureau under John C. Scott, Puget Sound Power & Light Co., chairman, presented F. E. Price of the Oregon State College, and Hobart Beresford of the University of Idaho, in a discussion of "The Power Companies' Activities in Rural Electrification as Viewed from the Standpoint of the Public."

J. A. Lockhart, chairman of the Commercial & Industrial Sales Bureau, offered H. N. Carroll, Pacific Gas & Electric Co., San Francisco, in a discussion of "The Importance of Building Load Down Town," which is abstracted in the following pages. A message from C. W. Kellogg, president of the Edison Electric Institute, was read and is published herein. What the other departments are doing to help the sales department build load was discussed by Ralph W. Lawlor, Northwestern Electric Co., chairman of the Accounting & Business Practice Section, on behalf of the accountants, and Magnus T. Crawford, Puget Sound Power & Light Co., vice-chairman of the Engineering & Operation Section, on behalf of the engineers. These papers are published. John Dierdorff, chairman of the Advertising Bureau, presented an abstract of the most successful utility advertising campaigns during 1939 through the medium of the radio news flashes referred to earlier herein.

To close the meeting Ralph J. Cordiner, president, Schick Dry Shaver Co., Stamford, Conn., former Northwesterner with Edison General Electric Appliance Co., delivered an inspirational address entitled "Looking Forward." He called attention to the pioneering of the utility industry in the Northwest in which many leaders left their impress on the progress and development of the industry, and in so doing left a fine heritage for the present industry to live up to. He warned that the utility business must be a local business. People are suspicious of absentee executives and local officers should make contacts with their customers. "Men and methods will be effective in creating further progress in the industry—not machinery and money," he said. "Appraise your objectives, take a long-range vision, have conviction that the service you are selling is the most important thing in the home, have courage to go forward with this viewpoint and set up your program to accomplish your objective in the light of men and methods."

The meeting showed a registration of 274, of which 167 were from outside Seattle and 107 local.

Response to Address of Welcome

By J. E. E. ROYER
The Washington Water Power Co.

THE FACT that our association is 32 years old this year is worthy of some thought. It should focus our attention on the years of effort that have been put into the task of developing the electric service industry in the Northwest and should emphasize the experience that has been accumulated by those who are a part of the industry.

ROYER

Those years, three decades ago, were the pioneering years, the hard years. Electric service was seeking public acceptance then. Those in the industry were concerned mainly with problems of generation, transmission and distribution of power—they were trying to make electric service work so that electricity could supplant other forms of power and light which already enjoyed public favor. Invention, ingenuity and plain hard work enabled them to go ahead, and the experience that was gained from day to day was the silent partner in every undertaking.

Experience Priceless Possession

This experience which has been gained by every one in the industry is a priceless possession for which there is no substitute. It has been wisely said that "all experience is an arch to build upon." If this is so, then those who have gained experience in the electric service industry are better equipped than any other individuals or group of individuals for the task of promoting electric service.

The problems of engineering, organization and financing were the prime problems in the early days of our industry. These have been displaced by the problems of promotion and utilization. Consequently, you who are associated with the Business Development Section find yourselves in the forefront; you are the shock troops in the advance of electric service.

Today we are faced with the prospect of great hydroelectric projects coming into operation, with an avalanche of kilowatts to follow. Our problem is reversed, for instead of furnishing electricity to meet the demands of the market, we must find the market to absorb the vast supplies of power that are becoming available.

This is a challenge to the Business Development Section—a challenge that must be met cheerfully and confidently. You are the logical group to accept that challenge and with your experience and intelligence you should be able to meet it successfully.

History of Industry

The history of the electric service industry has been one of progress—a steady increase of the sale of the product, electricity, with concurrent increases in the sale of appliances to use the product. In addition we have also seen from time to time the development of many new uses. We can expect this steady increase as a normal process. But, with the vast amount of electrical energy which is soon to become available we must forget the normal process. We must effect a sudden acceleration sufficient to absorb what otherwise might become a wasteful surplus. This acceleration must apply to every class of service—residential, commercial, industrial and agricultural.

In the world of business we may be sure of just one thing—the constant competition for the consumer's dollar. Those who have something to sell must make it sufficiently attractive to divert the consumers' dollars in their direction. This is a selling job—this is your job.

To begin with, we must remember that the utilization of electricity in the Northwest is already the highest in the nation. We must reject the tendency to regard this as a condition approaching saturation. Instead we must consider this as proving a public acceptance that will pave the way for greater utilization.

What quotas can we set ourselves to achieve this greater utilization? In order to double the consumption of electricity in the Northwest in the next ten years, we must double the consumption by residential, commercial and industrial customers; we must increase the use for municipal, railroad, rural electrification and miscellaneous purposes about five times!

In the residential field there must be much more lighting, greater use of ordinary appliances and extensive installation of larger appliances, including ranges, refrigerators and water heaters. In the commercial field there must be much more lighting, and great advances must take place in air conditioning. We must make air condition-

ing the rule rather than the exception in every commercial establishment. In the industrial field we can expect the influx of new industries to take a great deal of power but, in addition, we must concentrate on the greater use of electricity in the industries in our area.

Present municipal use is small in the face of intrinsically low cost power. Street and highway lighting is notoriously inadequate and, when the public generally realizes the advantages of adequate lighting both from the standpoint of traffic safety and the prevention of crime, we can expect this use to be multiplied many times. In addition we can look forward to a greater demand for the lighting of parks and playgrounds.

Greater use of electric power for railroad electrification in this area must be anticipated because only through electrification can the railroad achieve the smooth and fast operation that the public is demanding. It is only a question of time when the basic economy and convenience of electrification will outweigh the large investment that is required to change to electric operation.

Much to Be Done

Much is yet to be done in the field of rural electrification—more farms must be served and those already being served must use greater and greater amounts of electricity. Through the proper use of electricity all lines of farm production will be advanced and many new ones developed because of the availability of low cost power and through other scientific progress. Seasons may be extended by electric soil heating. Vegetable and fruit growing will be advanced not only by temperature and moisture control but also by farm processing through available heat and refrigeration. Through electricity, many present marginal farms can be lifted to levels of prosperity.

During this year and every year to come you will find plenty to do in the way of securing greater utilization of electricity. You must cultivate not only existing fields but you must discover new ones. The electric service systems of the Northwest are doing a good job today but to succeed they must play the major part in putting new power supplies to good use in constructive ways. These new supplies of power must not be allowed to destroy existing sources of power—such an eventuality would be injurious to the Northwest in the destruction of tax values, with the consequent discouragement to new capital.

We can build a greater Northwest through constructive cooperation, through intelligent planning, and through the wise use of the resources with which we are endowed. Men of the Business Development Section, that's your job.

To Sell or Not to Sell*

By C. W. KELLOGG
Edison Electric Institute

A FEW years back your chairman entitled his keynote address "Why Are We Here?" I think this question could well be implicit in every conference or convention we hold, for we must never forget that a large expenditure of time, energy and money is involved in every gathering like this one. In addition to the cost of this meeting itself, there is the question arising from time to time whether the continuation of the $75,000,000 the industry expends annually for sales and promotional work and the sales effort it represents are worth while. Sometimes the question is raised by a management hectored by problems of financing additional capacity, wondering if the effort is worth making. Sometimes it is raised by those fearing that a condition of saturation is arriving and that sales expenditures will meet with diminishing returns. Or again, it may be raised as a pure matter of an economy in expense to offset other growing costs of operation. To all of these questionings my own answer is: Yes, it is worth while.

In the first place, I do not think saturation is in sight yet. The increase in energy consumption per residence last year was exceeded in only one of the last ten years. For those whose figures are above the national average, there is always the accomplishment of the best to spur them on. Rate reductions, in spite of rising costs, continue to be the news of the day, and the only cure for them is vigorous sales effort. In the commercial field we have just begun to fight. We still have keen competition from other interests who are willing to spend their money and effort to try to get away from us our share of the consumer's dollar. Every year hundreds of thousands of young folks get married and start housekeeping; every year hundreds of thousands of people improve their economic status to the point of being able to purchase service and equipment they could not before; every year thousands of commercial customers reach a condition where they can use more electric service to advantage. The only way we can get this business as it comes to fruition is to be eternally out after it. Saturation is definitely not yet in sight.

Sales mean growth and growth means life. A business that has ceased to strive to grow and expand is a fossil. And let us not delude ourselves with the thought that cessation of selling would mean merely keeping a sort of status quo. It would not. We should in no time find *rigor mortis* setting in throughout the organization. Without the spur of sales activity and effort, our business would degenerate into a mere routine of keeping the wheels turning and a business in this state would no longer attract to its ranks men of enthusiasm and energy; we should become a sort of waterworks. Sales stagnation would soon react on those in our organizations engaged in growth and development, who would look in vain for a field in which to exercise their talents and ingenuity.

Sales a Life Force

For after all, sales is the department of our business which gives the greatest opportunity for self expression and individual initiative. Most of the processes of our business of necessity tend to become stereotyped and settled in a rut. This follows almost inevitably from the physical requirements of reliability and continuity of service. The work of the sales force gives to the whole organization, from power house to line crews, to meter men, to accountants, to the supervising forces, a feeling of something doing, of forward movement, of life. No one can justifiably doze off in such an atmosphere.

This burden, if burden it is, does not rest on us alone. The electrical manufacturers, spurred by competition among themselves, are never idle in the task of making better, more efficient equipment or of getting prices lower and lower. And in all our enthusiasm about what we have done with rate reduction, we must not forget that the major factor leading to the increased use of electricity in the home in the last two decades has been the invention of new apparatus requiring the use of electricity and the steady reduction in the price of such equipment. This has been the manufacturers' job and they have been able and effective allies.

And speaking of the manufacturers suggests a compelling reason for sales activity by the electric utilities in the fact that such a large part of our business is competitive. Many of the public think of our business as a pure monopoly, but we know that there are large and important limitations to this monopoly. It is true that, in order to prevent waste of capital through duplication of plant investment, the state regulation, under which most of our companies operate, gives the utility a monopoly in the electric service business. But the amount of business we *get* under that monopoly

* Extracts from address delivered at Sales Conference, E. E. I., Chicago, March 20, 1940, and read at Seattle Meeting of Business Development Section, Northwest Electric Light & Power Association, March 1, 1940.

depends upon our success in selling our product in competition with others. All large power business and the larger commercial business is in constant and direct competition with what the customer believes he can do for himself and into the equation come prominently considerations of flexibility and dependability. The refrigeration, cooking and water heating business in the home is in direct competition with gas, a fact which the gas companies never allow our customers to forget. A rough computation based on these considerations indicates that 50 to 75 per cent of our business is strictly competitive. In a situation like that there should be little question of the necessity for constant aggressive sales effort not only to get new business but to keep what we have.

Knowledge of Two Things

We know two things about our business. One, that even though we realize the competition is not fair, the constant pressure from government yardstick plants is to force rates down, and second, that with this pressure from above and the rising costs of labor and material from below, our only hope to be able to reduce rates (which we must do) without seriously hurting the net (which would ruin the business) is through selling more of the product. We certainly know that each successive rate reduction and each successive improvement in the efficiency or price level of apparatus opens up new avenues for selling that did not exist before. In a word, aggressive and eternal and thoughtful sales effort is really the only thing that can bring us successfully through the troubles that now beset us.

Goodwill Discussed

What we want above all else is to get and keep, by deserving it, the good will and respect of the people we serve. There are ways and means to accomplish this end which are outside the scope of this short paper, but sales activity greatly helps the process, by constantly keeping to the fore the idea of helping the customer to get more benefits from using our service. Intelligent salesmindedness is always working for the best interests of the customer and this attitude makes for greater friendliness in return. The greatest users of our service are the ones who appreciate it and us the most. Our number one problem in the present political and economic condition of the country is to keep our properties against the forces that would try to take them from us. Nothing will help more effectively to solve that problem than the greatest energy, the most skillful ingenuity, the most endless persistence in sales effort.

Markets and Forecasts*

By A. H. JAEGER
Edison General Electric Appliance Co.

LET US take a look at this fast growing new home market. Two million new homes are needed. Due to many factors, the shortage of homes is increasing instead of decreasing. The year 1939 shows an increase of 45 per cent over 1938, according to authorities. There has been a constant increase in residential building since 1934, and the estimated building for 1940 is 550,000 homes, which will almost equal 1928. This means that there will be more dwellings built in 1940 than in any one of the last 10 years.

One of the reasons for this building boom is that government aid through the Home Loan Agency and others will continue aggressively to encourage home building. On July 31, 1939, Stewart McDonald, FHA Administrator, stated that henceforth FHA would insure only those home mortgages which bear interest at 4½ per cent or less. While this represents only a fractional drop from the maximum 5 per cent rate in effect since FHA's establishment, translated into dollars and cents it means real money.

These savings will more than pay for a modern electric water heater installed. On even the low-priced house and lot of $3,500, with a mortgage of $3,150, the builder saves $162. These savings run up to over $1,000 on a $20,000 home. That would go a long way to pay for a complete electric kitchen.

A 70-year history of home building shows that a new upward swing is now under way; the peak will not be reached until some time in 1943, according to Roy C. Wenzlick, president, "Real Estate Analysts, Inc." This proves that war or no war, depression or boom periods, the home building trend does not change. The national or world conditions may affect the degree of rise or fall, but not the general trends. So you see we have four years ahead of us with a constant increase in home building. This should justify a definite program or plan on your part to go after the water heater business in the new home field.

The time to sell the electric water heater is before the final bid or estimate has been made on the complete home. After the foundation has started it is usually too late to sell the water heater. In many places the plumbing contractor is the man the distributor and utility work with, so he will specify electric instead of gas, oil, or other fuels. Because, if he bids on a hot and cold water plumbing system, he will naturally put in some kind of water heater. You all know that if an electric water heater is installed when the home is built, it will make the sale of an electric range and other major appliances much easier. The electric water heater is the key to an all-electric home in the new building field.

Rural Markets

When estimating forecasts on water heater sales and comparing it to other products, I am always impressed with the rural market and sales of electric water pumps, because the two items are closely related in the rural market. There are more electric water pumps sold in the rural market alone, than there are electric water heaters sold nationally to the rural and urban market combined. Every electric water pump user is a good electric water heater prospect. In fact, in this field it is usually the most satisfactory method of heating water. About 200,000 electric water pumps were sold in 1939 as compared to about 100,000 storage type electric water heaters.

Apartments and Large Housing Projects

In the past the apartment house field has not been considered a domestic water heater market. Some apartment house projects now under construction have purchased domestic electric water heaters; some others being planned are seriously considering individual water heaters for each apartment. This has many advantages. We believe the time will come when the apartment field will represent a good market for domestic electric water heaters.

Commercial Field

Some of your Northwest companies are doing a fine job in the commercial field now. This is a big market for heaters from the 2-gal. non-pressure jobs up to 140-gal. heaters and larger commercial installations.

When all fields are considered we have a vast water heater market, and speaking nationally, it has only been scratched.

From my personal contacts throughout the country, and from trend reports from our national field organization, it looks like the utility companies are going to put more sales effort on electric water heaters in 1940 than ever before. Because (1) it builds a good load and gives excellent service to the consumer; and (2) they know it is the present big promotional item with a good future for volume sales.

* Extracts from talk illustrated by slides.

The distribution and merchandising trends are towards dealer selling. I do not mean that utilities should or can successfully stop aggressive merchandising. Even if they do not buy and sell appliances themselves, they still have the promotion and merchandising job to do if they want to build load at a reasonable rate. If they sell appliances, they should set up their price structure and merchandising policies so dealers can compete. This does not mean that dealer subsidies are necessary.

The Federal Research Board's adjusted index of industrial production in December reached 128, a new record for the country, which had seen 125 registered in June, 1929, but never equalled thereafter for more than a decade. All inventories on January 1 were low as compared to a year ago. Our water heater production schedule set last November 1 for the first four months of 1940, was almost double our production for the same period of last year. Week before last we issued our production schedule through June which again shows substantial increase.

1940 Forecasts in General

The Standard Statistics Co., Inc., forecast that aggregate physical industrial production for 1940 will be a minimum of 10 per cent above 1939. As purchasing power in the industrial sections of the country increases, farm products will receive an additional stimulus beyond that already imparted by war expectations. On the basis of their current forecast, the stimulus to industry in prospect for 1940 should be sufficient to promote a general lifting of price levels sufficiently great to produce semblances of price inflations in a number of industries.

In listing "Best Situated Industries for 1940" Standard Statistics include electric power with these comments: "The utility industry having relatively fixed rates, makes a more even showing from year to year, although the long term downward trend of rates necessitates constantly increasing volumes to maintain a stable volume of aggregate revenues. Nevertheless, they should be in a relatively improved position in 1940."

Ability to Buy

Sometimes you hear a utility man say, "the reason we don't sell more is because the consumer cannot afford to buy." We all admit that there are many who do not have the price. But there are enough people who do have the price that if they all started to buy electric we would not be prepared to take care of them.

When you stop to think that there are enough passenger automobiles in this country to move the entire population at one time by automobiles, you know that there is roughly more than one automobile for every residential customer. The average price of a car is $800. You know how many are sold each year and you know the purchasers have to pay the cost to operate—gas, oil, license and insurance. I am not talking about the ease of selling $800 worth of automobile against $800 worth of electrical appliances, that the customers may think they do not need. I am only talking about their ability to buy $800 worth of electrical appliances.

In 1939 domestic electric customers bought 225,000 oil burners and units for house heating at an average price of $380, 104,000 gas burners and units for house heating, 94,000 stokers, 40,000 distillate oil burning water heaters. Our problem is to convince them that they need and should spend their money to buy our modern electric labor-saving devices.

Whenever I mix with sales managers of other industries, and attend their meetings, I am impressed by the intensive drives, contests, advertising and sales plans they set up to grab the consumer dollar. That is our competition and some of it is very keen. Let's not worry so much about the public's ability to buy or what price they will pay, but how to convince them that they should spend more of their money on our products and service. I am convinced, and I hope you are, that there are many millions of dollars spent that could bring the customer more satisfaction and value, a better investment and return on the dollar if it were spent on electric service and electric products. Our job is to tell them and sell them. It's not the price of our products or the price of your service—within reason—but how good a promotional job we do.

Home Service Value To The Utility

By R. E. GALE
Idaho Power Co.

THE majority of us are interested in selling the idea of electrical living to our residential and farm customers on the one hand and in creating good customer relations on the other. Most of us are endeavoring to reach these objectives through the use of some type of group and individual contacts. Generally speaking, it is very difficult to get men into groups to listen to a discussion of home problems and therefore our group audiences consist principally of women. Most of our individual contacts are made during the day with the result that the woman generally hears our story, and this is probably an advantage for us because after all she is the one who turns the switches on and off in the home. She is also the one who is responsible for the size of the electric bill and if she is satisfied that the electrical way of living is worth what it costs her, the utility company will very seldom have a high bill complaint from that home.

GALE

Most of us will agree that Mrs. America usually gets what she really wants—whether it be a new hat, coat, automobile or electric range. If we can sell her that the idea of living the electrical way is good, the utility's load-building problem will be solved as far as the use of electric service in the home is concerned.

Home Service an Advantage

Now since most of our sales contacts must be with women, the home service organization has a natural advantage because a woman can sell an idea to a woman more easily than a man can. Any man, regardless how good a salesman he may be, is handicapped whenever he tries to tell a woman how to run her home, and the use of our electric service for domestic purpose is most certainly very closely tied in with the problem of managing a home.

Salesmen have been very successful in selling appliances in the home, but once the housewife has purchased appliances, the amount she uses them determines the amount of revenue the utility receives.

With the numerous rate reductions being made here in the Northwest, the problem of getting the customer to increase use of present appliances assume added importance. We already have relatively high saturations of the larger current consuming devices (ranges and water heaters). True, we must get more appliances into the homes of our customers, but we know that this requires customer investment and takes time. The most ambitious merchandising programs by both company and dealers have seldom increased saturations of a major appliance more than five or six percent per year.

Evidently we all have a greater need for increased revenue than we can hope to obtain from additional appliances to be purchased by our customers during the next year or two. This additional revenue can be derived from a more liberal use of appliances now owned by our customers. The average customer is not sold on the idea that electricity

is cheap, and that she can afford to make more liberal use of our service. If we can get the average housewife to realize that she can make liberal use of our service at little increase in her service bill, we will get a good increase in net earnings.

I believe that a well-trained home service department can do more to secure this increased revenue than any other division of our load building organizations. The home service department can obtain this increased use of present equipment at a very reasonable cost too. One of the reasons is because our contacts, both group and individual, are with women. This is supposed to be a discussion of value, and it is very difficult to form an opinion regarding value without careful consideration of cost. In order to obtain some idea of the relation of value to cost, I have made a brief analysis of the operations of the Home Service Department of our company for the year 1939.

You may or may not agree with the figures presented but I believe they are quite typical of many of the Northwest companies. First a word about our home service organization. It consists of 22 trained women working a territory serving 52,000 residential and farm customers averaging only 14 customers per mile of pole line. The territory extends 400 miles east and west along Snake River Valley in eastern Oregon and southern Idaho.

Last year this Home Service organization called on 18,000 different customers. At each of these calls they made a sales presentation covering the following points:

1. Present use of our service.
2. Convincing the customer that she could not afford to decrease the use of our service, because of step-down rates.
3. That our company is a desirable organization to have retailing electricity in the territory we serve.
4. That the customer could afford to increase the use of our service—a. increased use of present appliances. b. acquiring additional appliances.

A check-up on 500 customers indicates that such a call will produce an increase of 4 kw.-hr. per month through more liberal use of equipment already in the home. This is a conservative estimate.

In addition to these 18,000 customer contacts, the department made 9,000 calls consisting of complaint calls, lighting demonstrations, installation calls (following purchase of new appliances) and various other types of miscellaneous calls. They also conducted over 400 group demonstrations and meetings which more than 16,000 of our customers attended. These meetings were cooking schools, lectures and lighting demonstrations of one kind or another.

As a by-product of these 27,000 individual contacts and 400 group demonstrations the Home Service women sold $36,000 worth of lamps and small appliances.

The question is: What did this program cost our company and what was its value to us? A careful analysis indicates that the *cost* was $40,000 for the year. The following will give you some idea of the *value* to the company of this activity.

As previously mentioned, we estimate that the 18,000 individual contacts would produce an average monthly increase of 4 kw.-hr per month due to more liberal use of present equipment. This increase for 12 months at 2c per kw.-hr. should be worth 96c per call.

It should be worth 25c each to get the 16,000 customers who attended the group meetings to listen to the programs presented. I am sure the direct and indirect benefits to the company are worth that much.

The Home Service women followed up 1,500 complaints on cooking and laundry equipment and on high service bills. These complaint calls are widely scattered and are usually of an urgent nature which increases the cost. This type of call is easily worth $2 each.

During the year this department made 2,000 complete lighting demonstrations in customers' homes. Since this type of demonstration has been actively promoted for over six years, those which we are now making are widely scattered and therefore more expensive. I have given them a value of $2.

Home Service women also made 2,600 calls on customers who had recently purchased new ranges and ironers. They assisted the new purchasers in learning the proper use and care of these new appliances. We estimate that these calls are also worth $2 apiece.

Since this department made direct sales of lamps and small appliances amounting to $36,000 during the year, we should certainly give them credit for a 20 percent gross profit on these sales, which is at least $7,000.

Now let us see what tangible values the company has received for the year.

18,000 calls—48 Kw.hr. @ 2c=96c	=	$17,000
16,000 group contacts @ 25c	=	4,000
1,500 complaint calls @ 25c	=	3,000
2,000 lighting demonstrations @ $2	=	4,000
2,600 installation calls @ $2	=	5,000
$36,000 sales—20% profit	=	7,000
Total tangible value		$40,000

This indicates that the department has at least been worth what it has cost us. But there are some other values of an intangible nature which should be considered. The developing of good, and prevention of bad, customer relations by the 18,000 individual contacts is certainly of great value to our company at the present time.

If the housewives of our territory can be convinced that our privately owned, tax-paying companies are the desirable sources from which to purchase their electric service, and if they can also be convinced that the service which we sell is cheap, I believe one of the major problems of our companies will have been solved. The Home Service department is a very important part of our organization which can and does convince our customers of these facts. Therein lies its principal value to our companies.

The Public Looks at Rural Electrification

By F. E. PRICE
Oregon State College

MANY of you who are attending this meeting will recall that it was in 1924 and 1925 that the real organized program to study and develop rural electrification was started in the Northwest. The power companies did not have rural service departments at that time. It was also generally true that the power companies did not have many, if any, men in their organization who were familiar with the problems of utilizing electricity for heat and power on the farm.

PRICE

In the organization of the program to study and develop rural electrification it was apparent that uses, in addition to lighting, must be developed in order to make the extension of electric lines in the rural areas a financially sound program if the rates were to be kept the same as in the cities and towns. It is just as true now as it was 15 years ago that no organization can long continue to operate whether it is a cooperative association or a power company which is dependent upon the income from electricity sold to rural users for home lighting only at rates equivalent to rates in the cities and towns. While the cost of building rural lines has been reduced to approximately $1,000 per mile, on the average rates have also been reduced throughout the Northwest in the past 10 years.

The State Colleges were asked to make studies of new uses of electricity on the farms. In Oregon this assignment was accepted with the understanding that these new uses must meet the requirement of being profitable and

convenient to the farmer, otherwise they would not be recommended. As soon as the colleges had definite, practical new uses of electricity to recommend, power companies sent men to them to become familiar with the new uses. This soon developed into the organization of special departments in the power companies which are generally known as rural or farm service departments.

Rural Policy

I am quite well acquainted with the qualifications of men in the farm electric service work in Oregon; I know most of the men engaged in this work in Washington. I am familiar with the policies which were established at the time this work was started. I am pleased to say that I can summarize this working policy briefly as follows: Recommend only those uses of electricity on the farm that can be justified from a sound farm management standpoint. To the best of my knowledge this policy is being followed in Oregon and I believe throughout the Northwest.

Our staff at the college and our Country Agricultural Agents have found the rural service departments of the power companies to be of a type with which we have been pleased to cooperate. In a few instances power companies have been unable to serve certain areas and the people in these districts have recently organized cooperatively for the distribution of power. Our staff is cooperating with these groups in exactly the same way as with the power companies and that is in the recommending of uses of electricity on the farms that are agriculturally sound.

The farm service departments of the power companies have, I believe, without exception developed the confidence of the farmers whom they are serving until now they are generally looked upon as competent specialists who are well informed in their specialized work. These men as a group have earned this confidence during the past 10 years by making it their business to be well informed on what constitutes sound agricultural practices. They have gone much farther than just familiarizing themselves with the various devices to use electricity. The rural service man who can make suggestions in such a way that the farmer can locate the cause of his trouble, can render a real service and make himself useful to his farm customers as well as to his company.

Rural service men in Oregon understand irrigation, the crops that can be irrigated profitably and the type of equipment that is best adapted to the particular job if the water is to be pumped. They know irrigation pumping costs and can cite actual figures taken from other farms which have increased their net income by irrigation. I believe they have been an important factor in bringing about the irrigation of more than 25,000 acres of land in western Oregon which is now being irrigated mostly by pumping. This development has greatly increased the returns from this land and made possible a more profitable type of farming.

These rural service departments in a large number of instances are looked to by electric users to protect them from buying unreliable equipment particularly when their advice is asked. Some of the men worry about recommending a certain piece of equipment. This is not necessary. Their job is to eliminate the unreliable equipment in a diplomatic way and we will help them. The good equipment will take care of itself. There is usually more than one good make of equipment.

Important Factor

I believe the men in the rural service departments have been an important factor in improving the companies' operating policies. This is because they understand the farm operators problems in the rural areas. I refer to such as seasonal power rates for irrigation, which are generally new west of the Cascades, and in making it possible to take more of the farm service thru one meter.

If there is any one place where the farm service departments have not measured up to the confidence their users have had in them, it is in their slowness, if not their actual failure to get their company managements to permit more general use of service on a simple farm rate. For instance, there is the question of allowing 7.5-hp. motors on the farm rate. This idea was easily conceived as a solution to a farm service problem but the birth of the regulation permitting its use was associated with long and strenuous labor pains.

Better Reception

Also, I believe the rural service departments would receive a better reception in the field if they could get the company to reduce the number of rates and therefore the number of meters required for various kinds of equipment. The lady who told the power company representative that she would sign up for service if it was Bonneville electricity did not necessarily have a new idea about the kinds of electricity. Perhaps the company who installed the three meters on her neighbor's farm—one to meter the house and barn service, one for the electric water heater and one for the electric motor to run the irrigation pump gave her the idea of various kinds of electricity. Progress has been made along this line and I believe more simplification will follow. There are still some rates in use that are too complicated. They can be simplified and still serve both the utility and the rural customer better.

While rural service departments are regarded favorably by the great majority of rural customers, I have questioned the advisability of assigning men of another department to do public contact in the same rural area. Farm people are inclined to take counsel from men whom they know and in whom they have confidence that has been established through consistently dependable service over a period of time.

I believe that a company that has a sufficient number of rural customers to be interested in their confidence and goodwill will come nearer getting it through a competent rural service department personnel and at less cost than in any other way. However, just because a man is in a rural service department does not make him competent. He must be judged on his ability to advise his farm customers on sound agricultural practices in a way that will build their confidence.

Public Viewpoint of Rural Electrification

By HOBART BERESFORD
University of Idaho

MY PERSONAL experience with rural electrification started about 1910 when it became a part of my chores to play nursemaid to a farm plant. Later in 1919 this plant was abandoned in favor of a cooperative rural line on which wholesale energy cost six cents per kilowatt-hour and one-half kva. transformers were in the majority. Later this same line was sold out by the cooperative group for $50 a mile, and everyone was happy about the immediate rate reduction that occurred when the property was transferred to the power company. This was in Iowa.

BERESFORD

There are many other dates that are important in rural electrification. Oregon claims 1906 as the date for their first farm line construction. Idaho had many rural lines in 1912, and in 1925 we saw the organization of an extensive research and investigational program under the National Committee on the Relation of Electricity to Agriculture. Since 1925 we have had fifteen

years of development in rural electrification accompanied by an example of one of the greatest productive cooperative enterprises that agriculture has ever witnessed, namely the C.R.E.A. organizations which functioned actively in at least twenty-two states.

The utilities have paid the bill for the experiment station and C.R.E.A. research and investigation. Just how much money has been spent throughout the United States I do not know. However, I do know that in the four Western states more than $200,000 has gone into the C.R.E.A. One of the reasons for the success of this program has been the splendid cooperation between the various subject matter departments in the agricultural experiment stations, and the fact that the utilities are not particular as to who got the credit for the results. This reminds me of a favorite motto which reads, "There is no limit to the good a man can do if he does not care who gets the credit."

More Emphasis

At the present time I believe there should be more emphasis in the extension field in the C.R.E.A. program. During the last few years the extension specialists and county agents have been called on to work with the various government agencies in the organization and promotion of rural electrification cooperatives. Previously the extension service had not recognized the field of rural electrification as one of its problems. Since the Department of Agriculture is now responsible for the Federal rural electrification REA activity, considerable heat is being turned on the county agents through administrative channels, and this situation is requiring them to become familiar with the problems of organization and load building in rural electrification. The rural representatives of the utilities have numerous opportunities to help the county agents solve their new problems. In return the county agents may help the areas served by the power companies as well as those served by REA with the organization of group meetings where mass selling of appliances, education on rewiring needs and general load building can be conducted for the benefit of all concerned.

Group buying of appliances, which in reverse is group selling, employs the same basic principles the utilities have followed in requiring group organization before an area could be served with electric power. Group buying means mass selling, and is one of the activities that is just as basically sound as the group distribution of electrical service.

Many areas have been served with electrical power that offer very little opportunity for a reasonable income on the investment in spite of the fact that there may be great political and military significance attached to the project. Ways and means of reducing costs of service must be considered. Fewer meters are needed and simplified rates. In Idaho we have a group of farm cooperatives that have received service from government-owned plants for 25 to 30 years. Meter reading by mail has long been a practice with these cooperatives. This is one way of lowering operating costs.

The rural agents and farm representatives of the utilities are in as close touch with their farm areas as are the county agents, who represent the extension service in the Colleges of Agriculture in their respective counties. In fact, in many counties the number of electrified farms requires that two or more rural representatives be employed to make their work effective. Seven hundred and fifty farm customers per agent should be the minimum number for effective load building activity. Since your rural representative is the closest to the farmer, his advice and recommendations with respect to farm problems should be heeded in determining policies and management for rural areas.

Why We Must Build Load Downtown

By HARRY N. CARROLL
Pacific Gas and Electric Co.

IT WOULD be presumptuous of me to come before you and attempt to write a prescription for doing the kind of work in which you have been engaged for many years and may know a good deal more about than I do myself. Therefore I will try to give you some observations and a picture of what we are doing on Pacific Gas and Electric Co. systems so that you may take from what I have to say anything that may be of value to you.

CARROLL

We long ago recognized the importance of commercial load building but lately we have become acutely conscious of it. We have realized that 70 per cent of our business comes from commerce and industry, some 161,000 out of our 900,000 total customers. Therefore the business is very important to us.

Certain types of this load are sold at a rather high price in comparison to some of the other types of load we serve. There are certain types just as susceptible to load building as the domestic load also. On the whole, if any one class of customer has any right to feel aggrieved for lack of attention, it is our large commercial and industrial customer. We are making a definite effort to keep in closer contact with these larger customers in order to eliminate any such grievances.

In our organization our commercial and industrial staff have definite territories assigned to them regardless of their specialty. These territories are for the purpose of conducting a customer-to-customer survey, systematically on a meter route basis. Any particular conditions found which require following up by a specialist are then reported to that specialist. The commercial staff members have ten surveys to complete each week. Their job is to check complaints and also to see that the customer is on the proper rate schedule.

Often it is found that the customer's change in operating conditions makes a rate analysis necessary. The customer is then changed to the rate which will give him the best advantage regardless of whether this means loss of business to the company or not. We have found that this eliminates the rate chiseler and has made for far better public relations. The customer soon realizes that he does not need to go to these rate chiselers to get a square deal. He will get it from the company if he takes his case to us.

During the past year we have extended our employee participation plan so that prospects for commercial and industrial business are compensated for, just as we have paid our employes for domestic prospects turned in and later sold. I believe you will find that the employees can be very helpful in this respect. Their approach is that of a customer to the people with whom they do business and therefore they are in a better position to suggest improvements in electric service.

We face the fact that any load building is a constant build-up. You cannot let down on it without losing some of your business.

In analyzing what kinds of loads we can best sell to build business, we have found that commercial lighting represents one of the best types of loads to develop. And while we speak of commercial lighting, it is well to face frankly some of the problems arising out of the new light sources, competition of other sources of power, and of new applications which present special problems.

In regard to these new gaseous light sources, we very definitely expect a period of poor lighting practice. This was experienced with the other forms of lighting when they were first introduced. We are endeavoring to face the power factor situation frankly with the industry and with our customers. We feel that our attitude is definitely unselfish. We have obtained from the State Railroad Commission an order requiring the correction of power factor on lighting equipment newly installed and a clause requiring that the equipment previously installed be brought to 90 per cent power factor by August 1, 1943. This we feel is definitely in the public interest in that it is an endeavor to save a part of our public from discrimination at the expense of the favored few who would use the uncorrected equipment. Our record of rate reductions during the past years has been maintained consistently and it will be necessary to maintain loads of high power factor in order to continue such a trend.

New Form of Competition

In speaking of competition from other power sources, we usually think of the steam generating units which generate power as an adjunct to some sort of a process where steam is used. However, in the past few years, a new form of competition is entering our field which perhaps has not yet invaded the Northwest. I speak of engine competition, so far mostly invading our agricultural customer field although the threat of its extension into the field of rather large power users in the commercial and industrial field is not to be overlooked.

On our farm lines there has recently appeared a new five-year contract for diesel engines which includes maintenance and service, including parts and labor, on a basis as low as $1.00 per horsepower-year. The new slow-speed diesel engines are highly efficient and the service problem which formerly was a handicap has been eliminated. Likewise, these companies are equipped to run an extra engine out on a truck to replace one that needs repairs so as to give almost continuous service. They also seem to have come together as companies to eliminate cut-throat competition between themselves and the price level of these engines has been reduced from a figure of $50 to $35 per installed horsepower in the case of medium speed diesel and gas engines and from $75.00 to $60.00 in the case of slow speed diesels. To meet this competition, our field contact work with our customers is exceedingly vital.

Another form of business which we have been watching carefully recently has been the growth of electric welding. There has been a phenomenal success in the welding of ships during fabrication and with the big shipbuilding program under way, this welding load is growing tremendously. There has been a 100 per cent increase in the sale of welding rods in the last ten years, the distributors of this rod tell us. The new ships are virtually sewed together by means of electric welders at high speed operation and exceedingly fine efficiency.

This welding service is supplied cheaper for its peculiar characteristics than any other class of business. The peculiar demands it makes on our system facilities are such that we are wondering whether this is a very desirable type of load or not.

To meet these situations, we feel that there is no possible substitute for personal contacts with our industrial and commercial customers. And likewise we have found recently that this can be supplemented by the development of a technique for working with groups of people as well as with the individual.

Recently we have done considerable work with the construction industry section of the Chamber of Commerce. Through this organization, a program is being carried on for the modernization of old buildings and for the stimulation of the building business itself. Another organization with which we have worked has been the Downtown Association in San Francisco. Likewise, we have kept in close contact with the Building Owners' and Managers' Association for the development of such modernization of commercial and apartment buildings as we can accomplish.

Not long ago the mayor of the city appointed a city beautification committee. We attempted to keep in the background of this activity but the mayor insisted that members of our organization were best equipped to render a public service with respect to the lighting and decoration of the city. Therefore our men are serving on these committees.

We have also worked with the Junior Chamber of Commerce in its safety highway and street lighting program and at the same time with other safety groups.

Last year our Pacific Coast Electrical Bureau was reorganized in order to do a more effective job in the development of electrical uses in the commercial and industrial field. It is conducting a very important job of modernization of office buildings at the present time. Another of its functions has been educational. A number of classes are being held to train the apprentices among the building crafts, particularly the electricians, the painters, and the printers, on the fundamentals of good lighting and wiring.

Through these efforts, we are endeavoring to keep close to our commercial and industrial customers and to build loads on the basis of a better appreciation of their needs.

How the Accounting Dept. Can Help

By R. W. LAWLOR
Northwestern Electric Co.

I AM ESPECIALLY pleased to be able to speak for the Accounting Section of the association, for I believe there are no two departments in the utility business more closely tied together than the business development and accounting departments. Back in the old days accountants were sometimes looked on as a sort of necessary evil or an anchor to be carried around. The operating departments and the sales departments were up and doing things, keeping the service going, getting new customers, but the accountant was a sort of studious person keeping books and recording the facts after they had happened.

LAWLOR

Utility accounting today may be thought of in two classes—general accounting and customers accounting. I will not spend much time talking on general accounting beyond saying that it is a mighty necessary part of our business these days. It involves the financial end of our business, preparation of budgets, financial reports and other reports for the use of yourselves and the management in order that they may be able to direct and guide operations. Beyond the requirements of ourselves, however, state and federal regulatory bodies are now requiring reports in such magnitude as to increase this work tremendously.

The customers' accounting department is one of the most important in our business, has more effect on customer relations and can do more to help the sales department in building load than any other department in a utility. Its work takes in the application for service, credits, meter reading, bill delivering and collections, from the time customer first comes on our lines until we collect his final bill. Every phase of it deals with the customer, affects our good or bad relations with the customer and affects your load

building activities in retaining the customer after you have once sold him.

We realize full well that times are changing overnight and we must change with them and keep in step. We realize that here is a job for specialists, not amateurs. That every man and woman must be well trained and above all must possess some of those qualifications that you men have—personality and salesmanship. In short we feel we must do a selling job the same as you do, and not a mechanical job of pencil pushing if we are going to collect our money and keep our friendly relations with our customers and retain the load that you have built. Regardless of what practices were in the past, I am glad to say that we are improving, our relations are improving, the selling idea is working, and there is as much difference between our old methods of taking care of customers and our present day streamlined selling method, if we want to call it that, as there is between the early day automobile and our present day streamlined car.

Think of our first contact with the customer when he first makes application for service. There is a real opportunity for salesmanship. We can't make out the order, sit back and say, "Thanks, I'll have the service turned on today." There is the time to sell the customer, to save a bad collection contact later on, to have a friendly chat, to tell him about our business, when he will receive his bill, when it will be due. Then is the time to impress him, because by his first contact with the employee he is going to have his first good or bad impression of the company and that will stay with him. It follows then that our representative must be well trained, must have personality and above all have salesmanship ability.

The credit man, who must protect our assets in a businesslike way, who must determine whether or not we need a deposit or security—there is a mighty important customer contact. I can remember the days where the customer was made to feel like a crook when the credit man with a frown on his face tilted his specks down on his nose, leaned back in his chair as if to say, "Well come on, tell me why you think our company ought to take a chance on you." Our man must ask him questions, courteous questions—has he a job and where; has he used service before and where and may have to ask for security. There again our representative must be well trained, must have personality and above all must have salesmanship ability. Here again is an opportunity to sell the customer on the importance of paying his bill and save strained relations from a collection call later.

In my opinion the most important part of this customer contact work is collecting the bill if it is not paid when due. This is important because if we don't make our collections, we can't continue in business because we can't pay your wages and mine; important because it has more to do with customer relations than any other function. Here again is a real selling job and I am glad to say we are making real progress. We can never again follow the old practice of calling on a customer with a pair of pliers in one hand and the delinquent bill in the other and say, "If you don't pay we will cut out your service."

A Different Situation

We don't say "Cut Out" any more. We talk, we sell, we discuss the account with the customer, we try to learn in a sympathetic way something about his circumstances. We realize that it has cost our company real money in advertising, radio publicity and in your time, to get the customer on our lines and we are going to do everything in our power to keep him as a customer and as a satisfied one. Here is a difficult situation, but contrary to some ideas, we can make friends for the company instead of enemies if we follow again the selling idea. Most customers are not unreasonable and if we do have to stop serving them because they can't pay, we will still be friendly if proper explanation is made.

We realize as you do, as all good salesmen do, that we do more harm to our customer relations if we permit a customer to overbuy, that delinquent accounts should be followed diligently but intelligently and that slow pay customers must be educated to pay, that we are not helping a customer when we permit him to stay delinquent. I have had men tell me, "I blame your company for letting me to get in as far as I have. You should have gotten after me before."

A Real Problem

Here is a job, a real job, that involves a real problem in customer relations. A selling job in some respects more difficult than the selling job you are doing, because we are taking something away from the customer and we must do it in a way that will keep the customer on our lines and keep him as our friend.

I am glad to have been able to talk to this sales group, to tell you that both our departments have a great deal in common, both having a selling job to do. To tell you that we feel accounting departments must take their stand along with you men and the management in the front line and do a super, super job. To tell you that in these troublesome times, more than ever before we need to have all departments welded together as a solid unit working in an intelligent manner for the good of our industry and to tell you that you may count on the Accounting Section for 100 per cent cooperation in your activities.

How the Engineering Dept. Can Help

By MAGNUS T. CRAWFORD
Puget Sound Power & Light Co.

THE SALES DEPARTMENT staff corresponds to the shock troops in the front line trenches, battling against sales resistance, competitive processes and methods, as well as competitive sources of electric supply. The engineering and operating staffs function in the background as the quartermasters and engineering corps, to see that the product is manufactured and distributed to where it can be advantageously used. As in the army, the engineers sometimes get into actual combat, and go out and help get business themselves. The most effective help, however, is in connection with technical activities which is their prime function.

CRAWFORD

The day's work consists of seeing that an adequate number of kw.-hr. are generated, transmitted and distributed to the point of utilization, with quality and continuity necessary for sales appeal. As in any other business, it is the extra activity outside of the day's work which contributes most toward the ultimate success. I will mention a number of these extra activities which seem to have particular merit.

Analysis of Specific Applications

The engineers and the business development men combined and made studies of the electric range load when it first began to assume importance, and made reports which changed the reluctance of executives to enthusiasm for promotion.

More recently extensive tests and thorough analyses have been made of the domestic electric water heating application. As a result of this work, this type of business is becoming an important factor in off-peak load building and rate policies are becoming more closely defined.

Gaseous tube lighting, particularly fluorescent lamp applications, now occupy the center of the stage. The best

results will come from close harmony between our respective groups. The utilization subcommittee in the Engineering and Operation Section is planning a paper on fluorescent lighting this spring, and one is also being planned on sodium vapor highway lighting.

Evaluation of Service Improvement

Some work has been done, but there is still a fine field for cooperative action between the two groups in making special studies to evaluate such matters as voltage variation and interruptions to service. There is a definite need for some more tangible procedure for determining the basis for justifying increased expenditures for avoiding interruptions and also for correcting low voltage conditions. We all know that revenues are increased and additional use by customers is definitely improved where good voltage and service continuity can be depended upon. To be convincing to executives, however, we should have supporting data which can be backed up by facts.

Code Revisions

The total cost of the ultimate service to every customer includes expenditures he must make for utilization equipment and for wiring, as well as expenditures the power company must make for its plant facilities and distribution. There are two national codes which have a profound influence on these factors, namely, the National Electrical Code which governs interior wiring and devices, and the National Electrical Safety Code which covers the power companies' installations as well as those of the consumer.

The engineers have joined forces with representatives from the business development staff, and with guidance from the Edison Electric Institute, have played a very active part in the periodic revisions which are made in these codes. The year 1940 will see revised editions of both codes put into the field. You doubtless know of the extensive tests, research and activities in the dissemination of data by the Edison Electric Institute, which resulted in several innovations finding a place in the revised National Electrical Code. The approval of the new thin-wall insulated conductors and increased occupancy of conduits, together with revised carrying capacities for conductors, will result in adequate wiring at lower cost. Changes facilitating the rewiring of existing buildings at considerably lower costs will be particularly helpful in development of additional lighting business in older structures.

I would like to give you this thought, that the worthwhile developments in our business have all been the result of the engineering, operating and business development staffs putting their shoulders together, rather than working separately. I think we should emphasize this in our future policy, and have more studies and combination papers at meetings of the Northwest Association.

† J. F. McAllister, Utah Power & Light Co., chairman; D. J. McGonigle, The Montana Power Co., vice-chairman, Home Modernization Committee, F. M. Ingraham, Idaho Power Co.; chairman, Home Service Committee, J. B. Buman, Northwestern Electric Co.

Residential Sales Bureau†

Good and Bad Customer Relations*

By H. J. MERILEES
B. C. Electric Railway Co.

SOME ostrich-type philosophers argue that because their company is giving a square deal, has low rates and good service they don't need to worry about customer or public relations. Sometimes this is true, but unfortunately in this day and age some of the best set up and managed companies in the country are subject to the most unfair, false and bitter attacks usually from the hands of a minority with an axe to grind. Whether we like it or not, this has become one of the definite hazards of the road that a public utility company travels and just as we would insure our own car against the hazards of traffic we must insure our business against attack with a sound policy of customer relations.

Customer Relations Policy

This policy of customer relations should be like any other insurance policy inasmuch as it should be in effect 365 days a year because the old slogan of locking a barn door after the horse is stolen applies very aptly in this connection. By this I do not necessarily mean a special department has to be set up with its attendant increase in expenses. I think the average utility company can adequately care for an intelligent customer relations program within its present organization providing some one person is given the responsibility, co-operation and authority necessary to make it effective. Work of this nature can be best handled by the personnel department because customer relations go hand-in-hand with the customer contact departments of the company. These departments with variations in different territories, are roughly as follows:

1. Meter reading and collection.
2. Application.
3. Sales department.
4. Cashiers.
5. Service departments.
6. Home service and home lighting.
7. Line departments.
8. Telephone exchange and general telephone contacts from such departments as billing.
9. General employee contacts made through other than business channels.
10. Co-operating dealres and contractors.
11. The industry at large.

These principal channels might be called the bearings and as the bearings of a machine are vulnerable to friction so these points where our organization rubs elbows with the customer are also vulnerable to friction. Therefore, our first thought should be to keep these bearings well oiled and running smoothly.

Starting from scratch the first and most important job in this program would be a complete analysis of our organization from the standpoint of these customer contact departments. The value of careful analysis cannot be stressed too greatly. It is only by knowing the facts and not proceeding on guesswork that a program can be laid out and followed through with the hope of permanent satisfaction and economy. Most of the utilities have come to realize the importance of this research work especially in the field of domestic selling and many companies

* A report of Home Modernization Committee.

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probably have a department already operating solely for obtaining facts by research as in our own company.

This analysis should begin among the employees of these customer contact departments who in most cases will be found keenly aware of the necessity for putting such a program into operation. This work of analysis should be maintained throughout the year. Many of the things we should correct are well known to the average employee and he or she would be only too willing to give us all the information he has. We pay bonuses for sales leads to employees. It would follow that we should give every encouragement to them in reporting causes of friction between the company and its customers.

After we have learned the facts from a careful analysis these should be classified and when this is done they will quickly show the points of friction that need oiling. The job from that point on is to weigh the importance of these various complaints and decide which should be tackled first and by what method.

Common Failing

A common failing of many suggested programs for developing better customer relations is that the suggested cures are usually of a costly nature. It is largely the same as an average doctor who deals with a wealthy client; while the ailment might be simple, the fee is far from that. The whole point about an intelligent program, such as is suggested here, is that in most cases it can be carried out for a very reasonable additional expense. As a matter of fact, I sincerely believe that if a company cancelled the majority of its present expenditures made in the name of goodwill and public relations and gave them to a properly constituted department, as outlined, not only would they do a more constructive job but I think they would be amazed to discover that it was actually costing them less money per year. The next step would be to make friends. Once the point of friction has been largely eliminated then the job of making friends, that is so important to every company, becomes much easier. There is no earthly use in trying to put the cart before the horse and make friends before these points of friction have been discovered and corrected.

The task of making friends becomes an enjoyable one and an inexpensive one after step one has been taken. Once the whole organization is convinced that the company means action I think you would be amazed at the support that such a move would receive.

Occasionally it becomes necessary to step right out and tell our story and

DAVIS (at Sales Meeting)

when that time comes and the pressure is on I think we should hit hard and often.

Sometimes it is thought that in the interests of customer relationship we should not sell too hard but I do not believe this to be true. People enjoy being sold; the only thing to watch would be not to oversell them. For instance, ours is a combination company and one of our customers using gas for house heating and water heating and electricity for cooking, refrigeration, lighting and other services, during one of the heavier winter months had a bill of over $25. Even when this was broken down and explained service for service it still seemed too high in the customer's mind, because the only thing he could seem to get through his head was that he was paying our company $25 for a month's service which he thought was "terrific." While we know that the higher income brackets can stand higher monthly bills and greater household conveniences we should be careful not to let these get out of proportion in the customer's mind.

When we are selling, let us not pretend that we are not selling. By this I mean such departments as the home service and home lighting. Let us admit that these services are designed to keep people sold on the appliances they are using as well as to educate them to further uses for electricity. As goodwill builders, I doubt whether any other two services we offer can touch these. A woman with a smart kitchen that has been planned by your home service department will be a booster and you can count on her for plenty of support. The average person can understand these free services if you explain to them simply that our interests are to sell more power, yes, but in doing so we broaden the use and bring down the average cost.

I sincerely believe the more we sell on a constructive basis, coupled with good friendly service on the part of all customer contact groups, the better will be our customer relationship.

Once more let me say that it seems a pity that we must worry about customer relations but it is just human nature to throw brick bats at a big company and, therefore, we must protect ourselves against them because bigness will beat us if we don't watch out.

Supervision Assures Successful Program*

By GUY E. DAVIS
Pacific Power & Light Co.

SUPERVISION is leadership and leadership is a prime requisite in any organized sales activity. Upon this factor, probably more than upon any other, depends the successful carrying through of a sales program. Increasingly the work of the sales force is being prepared and outlined in advance. The sales person is told what to say, what to sell, who to see, where to go, how many calls to make, and his record checked regularly to find out how closely he follows instructions. Sales programs may be planned without end. They may be comprehensive and minute in every detail. Budget estimates of costs may be made and funds appropriated. A sales organization may be perfected, but without expert leadership, without proper supervision, all will be to no avail.

A review of world events—economic ventures, social reforms or military campaigns—will remind us that the degree of success attained was due to a very great extent, to the type of leadership or supervision administered. Our own Revolutionary War, with such capable leaders as Washington, Adams and others of the same high type, serves as a splendid example. Against such great odds, only nobility of purpose and great leadership could possibly have succeeded.

In order that we may be more specific in our remarks relative to the part that supervision plays in the execution of a successful sales program, let us deal with a utility setup. Never before in the history of the industry have utility leaders been faced with problems of greater concern, and upon their alertness to the situation and their sane judgment, rests the destiny of the industry as a private enterprise. Almost without exception, privately owned utilities throughout the country are actively and aggressively engaged in the sale of additional services to present, as well as new, customers. The reason for such an activity on the part of any utility is obvious, in that their very existence is dependent, to a very large degree, upon their ability to secure additional revenues, that losses in net earnings due to necessary rate reductions will be absorbed.

Such sales programs must be broad in scope and complete in every detail, with all phases of the business being

* A report of Home Modernization Committee.

given full consideration. Consideration should be given to the following:

1. Certain definite goals must be reached within a given period if a program is to serve the purpose for which it is intended. A normal five-year job of expanding services and increasing earnings must be accomplished in one-half the time if we are to save the day.
2. Each move must be timed accurately and team work on the part of departments, as well as individuals, must be in evidence at all times.
3. Weak links in the chain must be detected and promptly remedied or replaced.
4. Definite policies must be established and firmly implanted in the minds of all concerned.
5. Tried and proven methods of operation must be followed, to the extent that mistakes will not be disastrous.
6. A means of securing and maintaining a high degree of public confidence must be found. They must prefer our service to any other.
7. A comprehensive dealer-company cooperative sales program must be prepared and properly executed. We must prove to them that the plan—if followed through to a successful conclusion—will pay dividends.
8. Advertising and sales promotion facilities must be adequate to provide complete coverage of territory. Such a plan must tie in with a national program as promoted by the industry at large.
9. Over-all sales costs must be kept within budget estimates as prescribed by the management. Every dollar must do its share.

Other matters of great importance and requiring careful planning and expert supervision, consist of the following:

1. A complete market analysis must be made prior to the beginning of activities, and arrangements made whereby same may be kept up-to-date at all times.
2. A sales organization must be perfected—great care being exercised in the selection of personnel and perpetual sales training facilities provided.
3. The full cooperation of all industry and allied interests must be secured:
   a. Maximum support must be maintained on the part of jobbers and manufacturers.
   b. Sufficient dealer outlets representing all classes of service must be maintained to insure adequate and efficient coverage of territory.
   c. A spirit of cooperation on the part of building supply outlets must be encouraged.
4. It is definitely an obligation on the part of a utility sales and service organization to endeavor to uphold standards of performance, as:
   a. A high standard of business ethics must be maintained.
   b. The sale of quality merchandise must be encouraged.
   c. Quality service on all types and makes of electrical equipment must be made available to all users.

The degree of success to be attained in a utility sales campaign, assuming that plans are complete in every detail, is largely dependent upon the ability of key men to instill in the minds and hearts of the front-line members of the forces, an enthusiastic attitude and a determination to carry on to the best of their ability. A spirit of cooperation must also prevail throughout the organization.

Through the medium of a well directed barrage of sales bulletins, sales meetings and personal contacts, the morale of the entire group must be maintained at a high level. Individual effort must be so directed as to insure maximum results at all times.

Dealer Sales Development Plan*

By L. S. CHEETHAM
Puget Sound Power & Light Co.

IT IS a far cry from present conditions back to 1897, when an eminent jurist rendered a decision in New York State in which he said: "An electric utility had not fulfilled implied requirements embodied in its franchise by merely supplying a customer with bare ends of copper wire charged with electricity. Their obligation was not completed until the customer had been provided with means whereby he could use the electricity." From this decision it can be seen that society imposed a high degree of responsibility on utilities, and in the pioneering period of our industry this was a heavy burden because we were faced with tremendous problems of financing generating capacities and distribution systems to meet the rapidly growing commercial and industrial demands for service.

Electrical manufacturers devoted their attention to meeting the need for central station generating equipment and other industrial requirements, with the result that domestic consumer problems were neglected by them. There was a scarcity of skilled electrical workers and technicians to meet the needs of the time in wiring homes. The residential user had no well-organized agency to turn to for assistance in solving his problems.

* A report of Home Modernization Committee.

In addition to these obstacles, the cost of rendering electric service to homes was high and not within the means of a large part of our population; and the gas industry, which was firmly entrenched in the field because of many years of development, presented a highly competitive situation for customers that otherwise would have been available for electric service. Another element that acted to retard the natural expansion of electric consumption in the homes was due to the public attitude toward electricity. It was looked upon as a highly dangerous, mysterious force.

Conditions That Existed

This is a very brief statement of the conditions that existed in the early part of this century. Under normal conditions of our expanding industry these situations would have been corrected, but other conditions were injected into our growth that retarded their solution. The first World War had a pronounced effect on the electrical industry. Unprecedented demands were made by industrial users for additional equipment and power, and adequate consideration could not be devoted to promoting the use of electricity in the home.

The depression in 1921 brought out weaknesses in many utilities' market structures. Capacity and load factors were adversely affected by the instability of commercial and industrial loads. The stabilizing qualities rising from home consumption were forcibly brought to the attention of the utility management.

It can safely be said that this period marked the beginning of an organized plan on behalf of the appliance distributors and manufacturers and the utilities in developing our modern marketing channels. The prosperity experienced in the 1920's resulted in great forward strides toward a greater electrification of the home and would have undoubtedly progressed to a much larger degree had it not been for the disorganizing effect of the depression that started in 1930 with chaotic business conditions in the years immediately following. Experiences of these years are too well known by all of us and deserve but little comment. Utilities had been under constant pressure for reduced rates, and the home offered the best opportunity to expand the use of services that were so urgently needed to curtail the shrinkage of revenues needed to meet the heavy fixed charges incurred by the expenditure of billions of dollars in the preceding decade. The conflict and friction that accompanied an intensive development of this market produced a tide of anti-utility merchandising bills

that were introduced in every state legislature in the Union with two exceptions, and the voluntary withdrawal from the merchandising field by some utilities. Following this action, the value of utility merchandising became apparent and there was a clamor for their re-entry in this activity by many trade associations, Chambers of Commerce, appliance manufacturers, jobbers, wholesalers, as well as the retailers themselves.

Many Problems

From this summary we can see that our progress in electrifying the American home has been accompanied by many problems of serious consequence and interruptions that retarded obtaining a desired goal. However, we have profited by these trying experiences. In contrast with the past we have today a well-balanced industry. Utilities have extended their services so that it is available in nearly 100 per cent of our homes. The quality of the service and the freedom from interruptions have reached a standard of perfection attained in no other country, and with these accomplishments there has been a continual reduction in rates that now make economic uses of appliances obvious to the consumers. Domestic rate structures have been so designed as to assist in the promotion and use of a greater number of electrical appliances.

Manufacturers have provided an abundance of diversified appliances, the quality of which is beyond question and at a price level to meet the needs of consumers in any income bracket.

The building industry has allied its activity so that it conforms with our best interests. Architects are designing completely electrified homes. Builders, realizing that such homes are more easily sold, have given attention to the desires of home makers in providing adequate wiring capacities for the various appliance uses.

Electrical appliance distributors, realizing that a vast market is available, have provided means for specialty sales and maintain an adequate stock with better displays and demonstration service and have coordinated these with financial assistance for the retail dealer. Retail dealers have become more firmly established in their communities, carrying a more complete line of electrical merchandise and have staffed their sales organizations with well-trained specialists.

Consumers are now in a very receptive frame of mind toward the purchase and use of electrical appliances. National and local advertising is stressing the importance of economies, health, convenience, time-saving and cleanliness in the use of electrical appliances. All of this contributes to a higher standard of living, and these messages are kept constantly before the buying public.

Time Is Ripe

In view of the conditions outlined, the time is now ripe for an extension of our efforts in coordinating sales activity to the end that more emphasis be placed on large-scale sales promotional work through the dealers and electrical contractors. The requirements of a well-rounded program must take into consideration the needs of the utility, the appliance dealer and contractor, and the domestic consumers. Our program has been developed with these elements in mind and is based on the premise that utility revenues from home consumption of electricity will automatically increase as sales of electrical appliances increase. Appliance dealers and electrical contractors are in a position to handle a greater volume of sales with a minimum increase in overhead expenses that will produce a greater net profit for their businesses. The consumer interest is essentially that of securing the most value for his dollar, both in the cost of electrical appliances and in the service used to operate them. This can be met only through efficient systems of marketing that result in lower distribution costs. This in turn is naturally followed by greater use of electricity at lower rates.

Coordinate Advertising

Our plan to accomplish these ends is based on definite and specific activities by sales representatives assigned to various districts and divisions of our company. These representatives will coordinate local advertising with national advertising; home service representative activities with customer and dealer requirements; dealer sales activities with the utility merchandise sales program; jobber and manufacturer promotional activities. These representatives will assist the dealers with technical problems, sales technique, merchandise displays, and give information about residential rates and the cost of operating and servicing of appliances. They will also promote the use of Electric Home and Farm Authority financing plans. In addition to these activities our representatives will keep dealers informed as to current developments in their business.

Our representatives will contact the building industry for the purpose of providing them with new ideas that will promote the designing and construction of completely electrified homes.

A complete coverage of the field and personal attention to the dealers' needs in these respects will contribute materially toward accomplishing the aims we have in view, and their effects on the utility business should be noticeable in that they will be an aid toward improved public relations on behalf of dealers and the customers. Beneficial results in the form of increasing revenues, improved load factors and a more highly diversified load will be enjoyed.

With a more wide-spread and increased use of electrical appliances there will be a diminishing demand on utilities for pioneering the new appliance field, with the result that they will be relieved of expensive programs in this respect that they have been forced to assume in the past.

From what I have told you about this plan it is apparent that it is a cooperative idea, and although I am aware of the fact that this word has been overworked in connection with merchandising, the "act" of cooperation has never been overdone, and it is in this respect that our present ideas take on a significant aspect and project them a step forward from other plans of the same name.

Mr. McLaughlin, president of our company, has described the program as follows: "We have organized a staff of trained specialists whose sole business is to expand our service to electrical contractors and dealers. These specialists will work with the dealers in the same manner that our farm men now work with farmers, our home service representatives now work with the home makers, and the commercial and industrial engineers cooperate with business and industry. The services of these skilled men will be available throughout the Puget Power territory immediately. This move, we believe, will mean more business for the dealers and contractors, more electric service for the customer's dollar, and the greater use of electricity."

Water Heater as a Revenue Builder*

By R. B. McELROY
The Washington Water Power Co.

THERE are over one hundred household uses for hot water service, in fact, the need for hot water in the home varies from basement requirements to the medicinal chest. But, in face of the obvious necessity for hot water service, the potential market has only been scratched and with few exceptions better than ninety out of each one hundred utility customers use other than automatic electric service to heat their water. This brings out a tremendous market

* A report of Home Modernization Committee.

ior satisfactory hot water service. Neither hot water service nor its continuous use has been sold and among all major services hot water receives the least amount of support from the dealers.

Public Demand

A broad public demand for hot water service has not been created either by the utilities or the manufacturer and the lack of customer acceptance has made the dealer steer away from the sale of electric hot water heaters.

The promotion of automatic electric hot water service in the past year or so has been somewhat effective; however, it appears that we should tackle this neglected market from the far more fundamental sales basis of changing the habits of the people so they will accept continuous hot water heating as a necessary service in the home. This, of course, means sound promotion, selective selling, coordinated efforts and the recognition that dabbling at the job or trying to slide over an inadequate service has little hope of producing satisfied users and resultant permanent success.

A great many factors contribute to make the water heating load most desirable. One of the principal factors is the individual water heater kw.-hr. consumption. When a water heater is installed, the result is to increase consumption by approximately four times the consumption of the average residential user. We know of no other residential service that has the potential possibilities for increased consumption in the home; therefore, the small percentage of residential customers who install water heaters bring up residential consumption and revenue very rapidly.

One Service

The electric water heater is one service we provide for our residential customers that can be largely controlled to fit into the off-peak period throughout the 24-hour period. With sufficient storage capacity, this load can be off from 4 to 6 hours out of each 24 hours and still render satisfactory hot water service to the home. Increased kw. demand of the water heater is small compared with the amount of kw.-hr. supplied. Consequently, the overall costs of serving our water heating load are small compared with several other residential loads; therefore, the water heating load is most desirable and in some cases the profits provided by the water heating load make it possible to take on the electric range load at a competitive rate for that service. It might be said, let the water heater load help justify the taking on of electric range business that could not otherwise be obtained.

The water heating load is salable (1) because the price has been made competitive; (2) it provides a customer service that is highly desired; (3) it brings electrical living within the reach of a greater number of customers.

Present day manufacturers of automatic storage type electric water heaters have developed types and sizes of equipment that will provide adequate hot water service under almost any condition.

It is generally agreed that the "backfence" advertisers are our best advertisers provided they are satisfied with the service they are using. With this thought in mind, our potential market will be expanded more rapidly when our present users are perfectly satisfied with the water heating service rendered them. Among other things, this means the proper installation of the water heater in the home so that it will render satisfactory hot water service at a monthly cost the customer is satisfied to pay.

McELROY

The *Plumbing and Heating Journal* for January, 1939 carried an article by a professor at Purdue University on "New Hot Water Piping Methods," in which he brought out that considerable improvement in domestic hot water service may be obtained by careful design and layout of piping. Each time hot water is drawn from a faucet, there is a certain amount left in the pipe, depending upon the size of the pipe and the length of the run to the individual faucets. This water loses its heat rapidly, thus wasting the kw.-hr. used to heat it.

Three methods are available for the reduction of piping losses. The first involves the use of an insulating cover; the second is the use of small size pipe or tubing; and the third is to reduce the length of runs from the water heater to the principal house faucets. A house plan may be laid out so that the cellar or utility room is located centrally with respect to the kitchen and bathroom, thus reducing the first cost of piping and the losses in hot water lines. In one of the professor's tests, it was found that water in uninsulated pipe was cooled from 137 deg. to 100 deg. in 25 min., whereas with insulated pipe, over an hour passed before the water cooled to 100 deg.

Overall Cost

In examining the factors which affect the overall cost of electric hot water service in the home, consideration must be given to the following: Cost per kw.-hr.; wasteful usage, such as leaky faucets, etc.; and the heat that is lost in the pipe to the point of most frequent usage. We can do something about this by proper water heater installations.

Most water heaters in the past have been improperly installed as consideration was not given to pipe size or to tank location. It is interesting to note that one foot of ¾-in. pipe holds about twice as much water as one foot of ½-in. pipe; that one foot of 1-in. pipe holds about twice as much water as one foot of ¾-in. pipe and four times as much water as one foot of ½-in. pipe. An actual installation tested not long ago revealed that between the heater and the kitchen sink was a run of 50 ft. of ¾-in. pipe. By changing the tank location in the basement, it was located just 10 ft. from the kitchen sink and connected with ½-in. pipe. The 50 ft. of ¾-in. pipe held four and one-half quarts of water, whereas the 10 ft. of ½-in. pipe held one pint of water, the difference being one gallon. It was further found that six quarts of water were drawn at the kitchen sink before the hot water arrived and since the average draw at the kitchen faucet is less than one gallon at a time, each time the hot water was used there was more than an equivalent amount of hot water left to cool in the pipe. Generally speaking, the kitchen usage comes in small doses but frequent, approximately 20 to 25 times a day over a 12-hour period. The average wait between uses is about one-half hour which is just long enough to cool the water in the pipe below the usable temperature.

It was conservatively estimated that the unnecessary losses in this installation in kitchen use alone amounted to about 20 gal. of hot water a day compared with a properly installed job. Considering other usages in the home, it is conservative to say that unnecessary losses due to improper installation of the water heater amounted to about 30 per cent of the total water heated. A smaller water heater, properly installed, would have given equally good service at considerably lower cost. It

is absolutely necessary that electric water heaters, to render customer satisfaction at the minimum of operating expense to the customer, must be installed at the point of most frequent usage which is at the kitchen sink, and the pipe from the water heater to the kitchen tap should, in most cases, not exceed ½-in. pipe.

Adequate Information

All salespeople who are responsible for the promotion of water heating service should be adequately informed regarding its benefits and preferably by the experience of having this service in their own homes. They should be so familiar with the value of hot water service in the home that they will impress their customers and dealers that electric hot water heating service is better, cleaner, safer and more economical.

In closing, may I briefly review the important items of sales procedure which will produce satisfactory results and show that the hot water heater is a future revenue builder.

1. It must be sold selectively, intensively, continuously and aggressively.
2. We must sell the use, value and economy of continuous hot water heating in the home.
3. We must stress the health, cleanliness, comfort and beauty appeals.
4. We must stress the need for year around service, pointing out the fallacy of heating water with house heating devices in the winter season.
5. We must replace old, obsolete and non-automatic water heaters with modern automatic electric service.
6. We should contact every cooking customer as a live prospect for automatic water heating service.
7. We must double and redouble our efforts to get more dealers to promote and sell automatic electric water heating equipment.
8. We must have specific sales plans with definite sizable objectives and then follow the plan.
9. We must work with and coordinate the sales of dealers, plumbers and electrical contractors.

Pioneering Stage

Electric water heating has passed the pioneering stage so now more and more dealers should be encouraged to enter the field. We must educate these dealers to a point where they will become interested and cooperate in selling this service. While some dealers have stocked water heaters in the past, they have made little or no effort to sell them so it seems to me that our first job will be to educate these dealers to the point where they will sell water heaters, not just handle them.

Sales Training For Dealers*

By L. F. DICKMAN
Edison G. E. Appliance Co.

THIS subject reminds me of the needs of certain small defending nations in Europe. They need help, not conversation, and they need it now when it can be of some use to them and not after they are gone. Dealers need sales training now so they can remain in existence, and enjoy a profitable business.

Dun & Bradstreet tell us the average small dealers' ratio of cost and profit is: cost of sales, 64.4 per cent; operating cost, 28.5 per cent; net profit, 7.1 per cent. It is to protect and increase this last percentage that the dealer needs all of the help he can get.

Many of our new major appliance dealers today are the electrical contractor and small appliance dealer; others are music stores, furniture stores, hardware stores, etc. who have taken down their shingle and put up a blazing neon sign proclaiming they are now the Blank Appliance Store for their community. They now find that instead of being just a contractor or merchant, they are in a fast-moving business loaded down with new responsibilities and titles such as sales manager, advertising manager, sales promotion manager, salesman, delivery man, service man, and even the duties of home service advisor are more than likely vested in one man. In addition, this year, as in no other period of appliance selling history, will the dealer be so exposed to competitive selling. It is at this time the distributor and jobber prove their worth to the program. Will his representative be a habitual chair-warming caller once or twice a month, or will he be, as the industry now chooses to designate him, a "merchandising counselor"?

It will be necessary that he know the market possibilities by products and be able to interpret them in terms of the territory of the local dealer whose business he is soliciting. For example, using figures of national average, a town of 4,000 population having in the neighborhood of 1,000 meters, would have the following sales potentials: 20 ranges, 100 refrigerators, 80 washers and ironers and 10 miscellaneous pieces. This is an annual dollar volume of approximately $26,400, though this figure may not be accurate now in the face of rapidly reducing list prices. He must establish in the dealer's mind the fact that there are profit possibilities in this business he is recommending. He must also know the reasons why his appliances are the ones the dealer should actively promote. This requires not only a full knowledge of his product features and advertising advantages, but also a reasonable knowledge of other appliance lines. With this information and background he is qualified to take over the program of dealer sales training.

Training Requirements

This training will require more than just how to approach a prospect or close a sale. It must include business management and sales direction. I mentioned that the dealer must be convinced of the profit possibilities in major appliance merchandising. It will undoubtedly be a much more difficult task to reconvince this same dealer of the profit angle four to six months later unless he has had the benefit of real assistance. Because major appliances have arrived at the consumer acceptance era does not necessarily mean that a dealer can purchase a stock of ranges, refrigerators, etc., and feel he has the "end of the rainbow" in his store. More makes of appliances, more dealers, lower prices, temptation of long trade-ins, short profit leader items, etc., all point to the necessity of sales training along the lines of selective selling. By this we mean passing up the no-profit deals for the full margin sale, selling up to quality and not down to price and concentrating on one line. It is not good merchandising for a dealer to tie up his investment and time attempting to meet the demands of several manufacturers. We believe distributors today are making this last remark the basis of their dealer organization program.

Dealer Relief Program

From this discussion it is easy to see that our merchandise counselor should have a program to relieve Mr. Dealer of some of the problems of his sales manager duties. He should furnish and outline for the dealer proven sales plans, showing him how to reach the ready-to-buy customer, how to win over the competitive buyer, and how to develop the next year purchaser this year. In addition, Mr. Counselor can assist materially with the advertising and sales promotion problems. Through his close connection with manufacturers, contacts with other distributors and broad territorial coverage, he is in a position to recommend the correct seasonal type of advertising plan and promotion to use that will tie in with other local and national activities. He should recommend when and how direct mail should be used, window trims and newspaper advertising, and weave this

* A report of Home Modernization Committee.

in with the Modern Kitchen Bureau's industry program. Here the dealer has a "free ride" on an extensive national and local sales promotion plan.

We now come to the firing line position—selling.

Whether the dealer is his own salesman or whether he has a crew, the furnishing of thorough product knowledge and use-value information of his particular appliances is necessary to provide a background for bringing the retailer and his men to as high a state of perfection in selling as is possible to attain. In meetings, the actual product information should be the first in the discussion. Sound slide films and records on product should be used; cutaway mechanisms, demonstration doors, product feature charts, sales literature and all types of promotion pieces should be studied literally so that no angle of product is left uncovered.

It is recommended that product sales correspondence courses, where available, be studied to furnish help to the salesmen who lie awake nights in their beds, staring through darkness, asking themselves over and over again, "Why did I lose that order?" No one knows too much about selling not to take advantage of these courses. At the successful conclusion of these studies, the distributor should furnish a notice of proficiency, such as a button or certificate, which, seemingly small, has a tremendous effect in developing confidence and assurance in salesmen.

Subsequent training using manufacturers specialists and home economists, with actual performance demonstration in which the dealer personally participates, concludes as thorough a product training as can be brought to the dealer's place of business.

Now comes service—the "By" word of your industry, and the "Passed By" word of too many organizations. The distributor merchandising counselor should put particular emphasis on this subject and make it an important part of a training program, the giving of satisfactory service. I am not referring to the "screw driver" type, but the proper handling of a customer's purchase, from giving attention on the sales floor to careful inspection and delivery of the appliance to the home. An additional important service is making a follow-up call after installation of the appliance. The dealer is at present relying a great deal on the utilities for maintaining service; however, the dealer himself, or someone in his organization should be qualified to take care of service problems. The distributor today is assisting the dealer to meet this requirement with a qualified field service supervisor who can conduct meetings in the dealer's place of business and furnish factory service information to him.

There are many other business matters in which the distributor merchandise counselor assists the dealer, and no doubt there is some question as to why we would take time to cover such obvious points. However, somewhere in the history of every dealer failure, you will find where the need of sales training was as obvious as some of our remarks. All of the above suggestions come under the distributor's responsibility to equip his dealer properly so that he may go out and obtain his share of this profitable major appliance business.

I suggest you consider this program of distributor aid in dealer sales training as an insurance program to maintain and increase the 7.1 per cent profit which indicates a successful merchandise dealer, which success is so necessary to the major appliance merchandising business today.

More Effective Use Of Sales Helps*

By ERIC HALL
Westinghouse Electric Supply Co.

WHOLESALE salesmen, who act as the connecting link between their manufacturers and the retail salesmen, know it to be a fact that probably better than 50 per cent of all sales promotion materials and display materials find their way into the waste paper basket, and unless the sales promotion material or display happens to be of an intriguing, dynamic nature, the salesman is little impressed. If the wholesale salesman were able to spend all of his time in one or two of his key accounts, no doubt he could get the salesmen to use the materials to greater effect, but unfortunately, he has to spread himself rather thinly. As a result, a week or ten days may elapse before he gets back to any one dealer's place of business. In that time the effectiveness of the sales promotion material has been lost.

Many times we hear the expression, "so and so is only human." I don't know of any place where this expression could be better applied than in the case of the retail salesman—particularly when we stop to analyze what we mean by the expression, "only human." I think it is generally conceded that the meaning is that we are subject to the frailties of human nature—procrastination, and mental laziness. It is a well known fact that if we are to get things accomplished by groups of people over whom we do not have any direct control, then we have to apply one of two methods.

Method No. 1 might be known as the "fear" method—or punishment method. Very obviously, we cannot use this method—at least, not directly. We might, diplomatically of course, point out to the dealer that unless he use his promotional materials and sales helps effectively, he will lose business to the dealer who is using them the way they should be used. But usually when this method is applied he will just scoff at you, and as I think you will also agree, the punishment is somewhat intangible. Therefore, we had probably best try the second method, namely—the "reward" method. In this method it is necessary to take some promotion in order to sell the promotion. How this best can be done, can be seen by the following two examples. The first plan has already been tried and found to be successful; the second plan is in the state of being put into effect at the present time.

Plan No. 1 was known as the Mr. Check Plan, as put into effect by the Westinghouse Electric & Manufacturing Co. It called for a shopping service to "shop" the various dealers involved, with the idea in mind of buying some electrical products. The shopper would listen carefully to the sales story as it was presented. If the presentation came up to the standard previously set by the shopper, through the distributor that was running the promotional plan, he would hand to the salesman a ticket, along with a $5 bill. On the ticket it would tell the salesman that he had made a good presentation and was being rewarded accordingly. If, however, the salesman made a poor presentation he was handed a ticket, on which it said "We are very sorry, but if you had learned your story better it would have meant money to you. Better luck next time!" The build-up to this entire plan was based upon a series of letters that would go out in advance of this shopping, instructing the dealers' salesmen to be on their toes and to read their sales promotion materials in order that when they were "shopped" they would have the story down "pat" and thereby be rewarded. I might say that this plan was put into effect all over the United States, and wherever it was used it resulted in a better and more effective use of sales promotion helps.

The second method for the developing of the use of sales promotion helps is known as the "Audition Plan," which is being put into effect by Westinghouse for the year 1940. This plan very briefly calls for a factory representative to call on the dealer and solicit the

* A report of Home Modernization Committee.

various salesmen in that dealer's organization to make an electrical recording of a sales presentation on any one of the Westinghouse electric merchandise items. A committee is then formed, representing the various dealers, the distributor, and the manufacturer. These recordings are played back, and the man who makes the best presentation is suitably rewarded. His recording is then entered into a statewide or districtwide competition. If it gets by this it will eventually enter into a nationwide contest, and should the dealer's salesman be the winner of this nationwide contest, then his reward is substantial indeed.

Here, then, we have the reward angle stressed very strongly; also underlying this is the punishment or fear angle, inasmuch as no salesman likes to have his sales story overheard by his fellow men unless it is a good one. Obviously, then, if the salesman is going to do a good job, is going to escape ridicule and is going to stand a good chance for reward, he must put his sales helps and promotional materials to good use. No longer will it be possible for him to give a haphazard sales story.

The two foregoing plans were national in scope, but local plans can just as easily be developed; for example, the use of a skit to present dramatically the effective use of sales material. Two wholesale men can do this at their group meetings in such a manner that the salesman will be impressed and amused.

Whenever possible, present your sales promotion materials as a package item, not as a single, ineffective piece. If possible, make a financial incentive to the dealer who will purchase his sales promotional materials in bulk. Remember he will be much more impressed by your presentation if you have a complete story to tell. It is safe to say, also, that the leading manufacturers today are tying in their powerful national sales story with their localized sales promotions. Point this out to the dealer; show him that a better use and understanding of the materials at his command mean more sales and profits. Make him conscious of national advertising and all that it means to him.

HOME SERVICE COMMITTEE†

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Home Service—To Help Sell Use*

By J. B. BUMAN
Northwestern Electric Co.

THE DEFINITE trend toward utility home service sales promotion work on an "all-service" basis as contrasted to specialization on individual services like home cooking and home lighting has caused a considerable renewal of interest among utilities relative to the possible increased benefits that may be obtained through such home service operation as an integral part of a well-balanced residential sales operation.

BUMAN

The subject of home service is not a new one. Much has been written relative to its scope, objectives and principles. In the main, these writings have dealt with home service primarily as a promotional and good will department designed to better public relations between customers and utilities, with approach based on specialization on individual services. With this approach there have been some outstanding records of achievement.

Home service meets the homemaker through many types of contact, the most effective and generally used being the sales-slanted lecture demonstrations to groups, home calls, radio programs, and through articles in customer publications—by stressing in all activities, the health, comfort, convenience, economy and profit appeals. Such lecture demonstrations enable customers to see appliances in operation—to see them in attractive settings—to see the many uses for them. Since most people are "sight-minded," one lecture-demonstration will bring many women in face-to-face contact with the advantages of utility service, whose appreciation or reception of other promotional activities designed to sell use, if often limited or even negative.

Home Service Pays Dividends—Home service pays dividends to the homemaker, the dealer, and other allied interests. Home service pays dividends to the utility, to the extent that the benefits and values to customers and dealers furnish a means for measuring the true value of home service to the company. In other words, the dividends paid by home service to others, are returned many fold to the company.

Dealers and other allies profit by home service activities which assist in: (1) creating new prospects, (2) developing present prospects into buyers, (3) bringing increased store traffic through store demonstrations, (4) satisfying customers' complaints on use of equipment, (5) training dealers' salesmen and other employees on the adequate use and operation of equipment sold or serviced by dealer, (6) helping customers in locating all dealers where desired electric equipment can be purchased, and (7) broadening dealers' market and extending trade area.

Home Service Stresses the Value and Low Operating Costs of All Residential Services—With an intimate knowledge of the homemakers' problems, a thorough and practical familiarity with the electric equipment operation and use, home service combines such knowledge with the ability to demonstrate and instruct groups of women how to get the full value from utility residential services. Thus, residential services become a better bargain in the customer's eyes.

Home Service Acts as a "Back-up" Sales Group—By not only pre-selling the use of residential service, but also by reselling the use, home service acts as a back-up group for the residential salesmen of the company and of dealers—both by developing prospective use of additional services and by carrying purchasers safely through the new owner stage to the satisfied user.

As to the relative merits of direct selling by home service workers, much has been advanced both for and against. Broadly speaking, where direct selling of merchandise is carried on through home service there is always the danger that such merchandise selling will be utilized as the direct measure of "tangible results." While in certain cases it would seem not only desirable but necessary to sell certain appliances, nevertheless, emphasis should not be placed on specific merchandise quotas to the exclusion of the need for activities aimed at securing added use by present customers of present equipment.

Home Service Keeps Customers Sold—One of the fundamental principles of home service activities is keeping customers sold on the services they are using. Neglected appliances go out of use because of disrepair and obsolescence, and neglected customers are easy prey for competitors, both those seeking to turn the housewife's utility dollars into totally different channels, and, worse yet, those deliberately striving to divert such dollars to the purchase of directly competitive substitute services.

Home lighting is just a single phase of a good home service program that offers tremendous possibilities for enthusiastic work by the home service

*Report of the Home Service Committee.

advisor. With all the educational work that has been done by utilities, lighting fixture manufacturers, medical authorities, and from numerous other authoritative sources, the way has been paved for serious interest by the customer on home lighting problems in their home which they are now fully aware of.

We all know that thousands of IES lamps have been sold in every community. We also know that there are many that have not received correct lighting advice, and even where they have, that the new lamp has often partially supplanted some other form of lighting that was already in use. As a result there has often been only a slight increase in the lighting in one or two spots in the home. This is not the answer to good lighting or balanced lighting. Balanced lighting means that there should be a lighting intensity entirely without shadows and with such an intensity that one can read with ease anywhere in the home.

I have mentioned home lighting particularly because it is one of the important phases of any home service program that is receiving a good deal of attention. Obviously, it is the place where more business will accrue to justify a home service program and one where the customer will receive substantial benefits.

Home service is the new sales arm of the sales department. Four years ago the first official Home Service Committee meeting was held with the Business Development Section. It is interesting to note that papers presented at that time discussed the problems of cooking chiefly. Today it has broadened out to include practically every service application in the home. At our meeting this year every important angle was discussed. Five years ago there were 113 home service representatives in the field and today there are 162.

Home Lighting Light Conditioning*

By WALTER E. POTTER
Inc. Lamp Dept. of General Electric Co.

SIX years of Better Light — Better Sight promotion have caused a steady increase in the average size of lamp bulbs sold. This is encouraging but the real job lies ahead. Telling the Better Light—Better Sight story needs to be continued, repeated and intensified. At least 10 percent of all the sockets in the average home are still empty. The number of IES type lamps sold to date, represents less than 1½ per cent of existing sockets.

* Report of the Home Service Committee.

Since even mediocre lighting is better than no lighting at all, an important step is to get all customers to want lighting badly enough to use the lamps they now have, and to fill the sockets they now have with bulbs of a size to produce a larger measure of adequate lighting. Then, as fast as possible, get them to put the right size bulb in each socket and *use* it. To get this done requires, first, a Sales Training job which is specific and immediate; and second, adequate, coordinated sales effort. Both jobs must be done by the industry jointly—neither utilities nor manufacturers depending entirely on the other.

Better Lighting is still the most needed electric service in today's home. A recent national survey conducted by Woman's Home Companion shows what it takes to give Light Conditioning to 1,000 average homes. It requires 2,000 single socket adapters, 4,200 shower fixtures adapters, 3,000 candle shades, 5,000 IES lamps, 4,000 wall lamps, 1,700 other portable lamps—making a total of 20,000 modernizers.

Composite Survey

A composite survey conducted by several utilities in the Northwest involving 491 homes or 2,673 rooms showed only 395 homes with IES lamps—less than one per home. Some had more than one, but many had none. Empty sockets were born in 338 homes. Each utility can well afford to use the local figures obtained for their own property.

The principal weakness in the organized effort on the part of utilities and lamp bulb manufacturers to get proper lighting installed and maintained in homes has been lamp bulb dealers. For the past several years, the Mazda Lamp Promotional Departments have sought to remedy this weakness by providing excellent printed training material and displays designed to help the merchant sell the proper sight-saving bulbs. The General Electric "Hour of Charm," nation-wide radio program has been telling its listeners the story of Better Light—Better Sight.

Important Development

A vitally important development is the introduction of the 300-watt bulb to take the place of 100-200-300-watt lamp for IES floor lamps. More sales emphasis must be placed on the use of this type bulb to assure that adequate light for reading is provided any time the lamp is turned on. The three principal sales appeals are:

(1) *More light for the money*—it is about one-fourth more efficient than its predecessor the 100-200-300-watt lamp;
(2) *More convenience* in obtaining light for seeing;
(3) *Actually getting good Lighting* whenever the bulb is turned on.

Experience shows that even customers who want and ask for these bulbs have difficulty in getting them unless the utility has taken steps to get them into their own and local dealer stocks. To meet a long-felt need for better styling of IES lamps, there has been set up a new Board of Design for such lamps.

Fundamental Value

It seems necessary that better lighting for its lasting benefits to all concerned, will be more profitable, if a bit of time is taken by home service advisors to sell lighting for its fundamental value. Here we find that the science of seeing may become the inspiration for longer burning hours and the use of higher wattage lamps, but it is necessary that this contact person be well-informed about various and numerous pieces of lighting equipment, adapters and conversion pieces, in order to lay a firm foundation for lasting returns. It is to focus attention on active sockets and this aspect of approach should be considered especially important for its greater productivity in lighting suggestions for the home with fewer rooms and fewer lighting outlets. Calls made on this type of customer seem to suffer and be handicapped when made without some type of equipment to use as a demonstration kit. This seems particularly the case when dealing with the lower income type of customer since a better selling job can usually be done and will be more understandable if lighting and seeing can be illustrated in some manner. The most essential pieces for such a demonstration kit are:

1. A set of "before and after" photographs to illustrate what light will do. Selected for their appropriateness. (It is well to build up a set of photographs of local homes.)
2. Assortment of Mazda bulbs.
3. A Light Meter.
4. An indirect reflector.
5. A long extension cord.

A loss of sale is likely if the customer is forced to go to the dealer to buy it. Light conditioning pieces, adapters for drop cords, or pieces which will modernize old shower fixtures, offer ready sales as a vehicle for advantages to the customer in better seeing in their homes as well as an opportunity for the utility to benefit with the use of higher wattage bulbs. Most utilities have developed some method of direct selling to the customers of IES lamps and adapters for modernizing old fixtures.

The converting of old lamps to modern ones offers one of the most appealing and attention getting of all sales appeals. The customer sees an opportunity to have the benefits of the "new kind of lamp" by bringing up-to-date the thing she is perhaps forced by necessity to continue to use. It is stated that this conversion feature aids and does not hinder the sale of IES lamps. The customer keeps abreast of the times and is grateful to the utility for the services

and suggestions. Precaution should be exercised, however, not to become too deeply involved in the making over of lamps since time does not permit it unless the idea has become concrete enough to become part of an organized project.

For the coming year, utility home lighting efforts should comprise two parallel activities, namely:

1. Selling *Use* of Modern Better Light —Better Sight Fixtures, and
2. Selling the *Right Bulbs* in Fixtures and Lamps the customers now have until they can be persuaded to purchase more adequate equipment.

As a platform for the coming year we could well adopt:

Continue and intensify Better Light —Better Sight type of promotion using the available help of Better Light—Better Sight Bureau and Mazda lamp manufacturers.

Promote the sale and use of more adequate "seeing machines" such as IES lamps using the new 300-watt bulb.

Promote the sale of proper bulbs for all existing sockets in both IES and non-IES lamps.

Promote regularly burning of all such bulbs freely, because they are needed for seeing and because the electricity to keep them lighted is cheap.

Promote use of silver bowl lamps and adapters to give Better Light from present fixtures at small cost.

See that your own utility as well as the dealer, displays modern Better Light—Better Sight equipment the year around and that floor sales people and all other sales people know and actively sell Light Conditioning twelve months this year.

Home Service Community Promotion*

By MILDRED ELROD
Northwestern Electric Co.

HOW we promote home service through community organizations can be answered by looking at some of the activities during the year. To clarify I shall divide our activities into the following groups:

1. Trial range hostess parties
2. 4-H Clubs
3. Church groups
4. Women's clubs
5. P.T.A.
6. Girl Scouts and Campfire Girls
7. Floor demonstrations
8. Community clubs
9. Public schools
10. Radio
11. Cooking schools
12. Granges
13. Picnics

When a salesman in the territory places a trial range for a customer's use, our advisor calls immediately with the suggestion that the customer have a demonstration for her club. This demonstration follows a more or less set procedure: 30 minutes of electric cookery, during which cookies are baked for the afternoon's refreshment. Another 30 minutes is devoted to home lighting. The advisor has previously arranged the living room with auxiliary floor lamps and pin-it-up lamps so that there will be sufficient light for sewing or card playing. Sometimes a film is shown. The hostess, without exception, has fallen into line through her "vanity" by baking a cake or making a delicacy in the electric oven to show her guests. The well-known "grapevine" is then started. Each woman present belongs to another little group and if she is interested in electric cookery, she'll want a trial range, or if not, then a lighting program for her club.

Advisors in Demand

Advisors are becoming more and more in demand by these groups. They are small but extremely important disciples in our business. The most interesting result to us in this activity is that we are reaching almost exclusively the small user who is shy and yet so enthusiastic after using this electric servant in her own kitchen.

The 4-H Club work began by accident. Prize-winning "cooks" of one of the local groups were being sent to the state fair for the meal tryout. They were to prepare their food on an electric range, which was a new experience. One of our advisors assisted them in this problem. Now we give considerable guidance to these groups—homemakers of tomorrow—by lending equipment and giving instruction, as well as sharing in their success. In one of our communities the advisor and local manager have been so helpful that they are always the preferred guests for the practice meals the 4-H Club members prepare.

Ladies Aid Work

We are able to work with the church Ladies Aid groups in two ways, one of the best contacts being through lighting. Many times our advisors have arranged the meeting room with good lighting so that the bazaar or church supper could be *better* seen. The other major service is making coffee. We have five fifteen gallon portable water heaters, painted white and on stands. These are filled with water and heated, and a great quantity of coffee—good coffee—can be made with no effort at all. The water is useful in dish washing, too. One of our advisors roasted two 20-lb. roasts for a church conclave, and baked 240 biscuits for the supper on a trial range. Although we don't usually think such quantity cooking advisable, in this case the "K.P." group was most enthusiastically sold on electric cookery.

Although the local women's club calendars are seriously planned for an uplifting year in book reviews and child psychology, we have found ourselves most welcome. In these meetings our programs are from 30 minutes to an hour on both better lighting and table cookery. The attendance at these meetings is always greater than is customary.

Opportunity to Crusade

The parent-teachers organizations are grateful to us for contributing a talk and film on better lighting each year. In these programs we have a golden opportunity to crusade for better school lighting. In the past year a great many public schools have become aware of the necessity of more adequate light. In fact, not long ago we were asked by a county school board to talk and show a film on lighting the school.

Our advisors give unlimited assistance to the local Girl Scout and Campfire group organizations in passing their badges and honors on homemaking problems. Often window space has been donated for their activities. I feel we cannot overlook the future homemakers if our business is going to succeed.

It is a question whether our semimonthly floor demonstrations have been a success because of the community promotion, or vice-versa. It is important to us to note, however, that these demonstrations are growing in popularity and bringing us closer to the customers. Demonstrations are informal and various pieces of equipment are used. We conduct them on the days of the heaviest traffic and are never too busy cooking to chat with the customers. On these days many engagements for community functions have been arranged.

In discussing community clubs, or those clubs composed of men, I should like to tell you of two outstanding events, for they will give you the clearest picture. One of these clubs asked for a class to teach them how to cook. Another club, after hearing a talk by an advisor on lighting, asked that she go to the new library under construction and see that proper lighting was arranged—and then sent her to jail! Believe it or not, one of our towns has a new jail with adequate lighting for its guests.

Home economics departments, due to no fault of their own, are inadequately provided with equipment in most of our communities. Since this is true, we arrange a demonstration in September

* *A report of the Home Service Committee.*

of each year for all home economics instructors. At this time we acquaint each one with modern equipment and with the services available to them. For this occasion we have found the best results were obtained when we had an hour's demonstration folowed by a buffet dinner. Very soon after such a meeting the advisors make a call on the instructors, and at this time make appointments for demonstrations in classrooms during the year. We conduct the home economics classes for a day on the use of a mixer, baking in a roaster, table cookery, repairing cords, etc., refrigeration and revamping old lamps. In several schools we have even been invited as guests for the assembly, showing a lighting film and conducting discussions on adequate light.

Spring Cooking Schools

Our spring cooking schools perhaps draw upon the community spirit more than the previously mentioned activities. These schools are held annually in eight towns. The local newspapers sponsor these schools. Preceding the schools various contests are conducted and prizes offered. A cake-baking contest is usually held and a local organization takes charge of the sale of this food to help some cause along. Last year our total attendance was 4,000, so at least a third of the rural families were reached. This activity not only paves the way for increased electric usage, but also brings to light a large number of prospects.

Our company, in common with others, is alive with grange groups. We have been a part of a program in over half of the granges. This program follows a pot-luck supper. These programs are enthusiastically received, and here again the water heaters or coffee makers, as we call them, are in great demand.

Ariel Picnic Ground

The last major activity I wish to mention is a seasonal one—the Ariel picnic ground. Here we have a very delightful picnic spot equipped with tables and benches, electric plates and running water. During the summer several thousand people picnic there each week. One of our advisors is on duty each weekend to act as hostess and supply quantities of coffee free of charge. The groups come and get the coffee and serve themselves. Here again we use those five water heaters to a great advantage. Our advisors not only perform a very useful and appreciated service with electrical conveniences, but are the best "lost children finders" in southern Washington. I might add that the advisors do not wear a uniform, but wear their names and title, thus distinguishing themselves from the matron on duty.

Dealer Sales by Home Service*

By CULA BUKER
Edison G.E. Appliance Co.

APPLIANCE sales have been promoted to increase load but adequate promotion has been necessary to keep that "load" being used, to keep it in repair so that it could be used, and to train the customer to use it to the fullest advantage.

"Home service" has had three aims: (1) to promote the desire or create the need for electric appliances, especially the major appliances; (2) to keep the customers using the appliance, knowing that satisfied users in turn promote the sales of appliances to others; (3) to promote "good will," or make friends for the company, by the valuable services which they could offer without a charge.

Electrical dealers are customers and through training can do much to help "build load" for the power company as well as to create "good will."

Various methods have been used to assist the electrical dealer in the promotion and sale of the major appliances which he has to sell and to instruct his customers who have purchased the equipment. Reports have been received from each of the eleven companies in the association territory that carry on home service activity.

Let us consider, first, the eight power companies that are coordinating their own merchandising program with that of dealer promotion.

Dealer Schools

Utah Power Co., with Nancy Finch as home service director, held 40 dealer schools last year with an attendance of 10,429. These schools were given using dealer equipment and advertised as the dealer's school—29 of those 40 were held in the two largest cities, Salt Lake and Ogden, and represented jobbers as well as dealers. In the third largest city, Provo, a series of "all-dealer" schools was held in which the necessary number of school days was scheduled to use the various types of merchandise represented in that division. The expense of these "all-dealer" schools was shared equally by the participating dealers and the power company. The expense of the other schools, in Salt Lake and Ogden, was taken care of by the power company.

The home service advisors of Utah Power and Light Co. have charge of dealer calls and make plans for the work to be done for the dealer. Home calls are made on dealer sales just as for power company sales. Floor demonstrations are held in the dealer's store, high schools or community building in the smaller territories outside the cities. Radio programs always specify that any merchandise discussed can be purchased either at the local power company or electrical dealer's store.

Idaho Power Co., under the direction of Helen Swanson, reports that in 1939, 80 per cent of the total amount spent for electrical appliances was accounted for by dealers. The home service department has given the dealers all the assistance asked for, providing it could be planned in advance. Some schools and sales demonstrations are held in the dealer's store. 1940 will bring a more concentrated dealer promotional activity by Idaho Power Co.

The Montana Power Co. has twelve advisors supervised by Dorothy Stewart. In 1939, 29 per cent of the total calls made were for dealers. Training classes are conducted for dealer employees and floor demonstrations held for their customers. Each range and ironer sale is followed by an "installation call;" all other calls are made at the request of the dealer. The company bears the expense of all calls and demonstrations. Dealer sales on ranges in 1939 were approximately 64 per cent of the total sales. All ironer sales were by dealers. The dealers have realized the value of home service work in helping to promote the sale of their equipment and are requesting more and more help.

Pacific Power and Light Co. has advisors under the direction of Mrs. Audrey Herington. In 1939, combination cooking schools and appliance shows were held extensively throughout the districts. In these, dealers were asked to set up displays and use tie-in newspaper copy. The total expense was carried by Pacific Power and Light Co. The home service advisors have been giving dealer sales instructions and have made "follow up" calls on appliances after installation by the dealer. In connection with home lighting, reference is made to the dealers as suggestions as to where to buy the recommended lighting. In 1940, "use value" training classes will be stressed for dealer salesmen, with actual range use being given. In rural communities, closer cooperation will be promoted by means of group demonstrations in community centers.

California Oregon Power Co. employs two home service advisors under the supervision of Yvonne Smith. The dealer promotion consists of home calls, cooking schools, and the instruction of dealers and their salesmen. Cooking schools are held in dealer's stores.

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* *A report of the Home Service Committee.*

British Columbia Electric Railway Co. has five home service advisors under the direction of Jean Much. Promotional efforts, so far, have been to demonstrate major appliances sold by the dealers. Dealer salesmen are invited to take advantage of special sales course offered by the power company. "Follow up" calls are made on the dealer sales in the order in which they are reported. Appointments are made for calls. The dealers report that the home service assistance in demonstrating appliances in the customer's home, helps in closing the sale.

Puget Sound Power and Light Co. has 17 advisors under the supervision of Mrs. Edith Rauch. Fifty per cent of the home service time is spent on lighting promotion. The advisors cooperate with the dealers in their territory through the development of sales of IES lamps, lighting fixtures, and adequate wiring. Such equipment is sold only by the dealers. Dealers' customers purchasing ranges are given the same service as those purchasing from the power company. In some localities, demonstrations of electric cooking are given in the dealer's store but, due to lack of personnel, it has not been in general practice. Cooperative cooking schools are given in all localities. Where it is possible to do so, sales training classes in electric cooking have been conducted for the dealer's salesmen.

The Washington Water Power Co. home service department is under the direction of Mrs. Lucile Ramirez and, at present, has 20 advisors. Educational training for the dealers and their employees was stressed in 1939. The dealer's equipment was used and the classes held at either the dealer's store or the power company kitchen. Contacts are made with the dealers regularly by the Home Service advisors and "follow up" calls are made to demonstrate the major equipment sold by dealers. Organized cooking schools are conducted in the dealer's store. As a result, range sales by dealers increased 22 per cent in 1939 and 1938. Water heater sales increased 50 per cent.

Lighting Schools

Lighting schools are held in the dealers' stores where complete lighting demonstrations are given and films shown. The Inland Empire Electrical Equipment Assn. is an outstanding achievement in dealer cooperation.

There are the three power companies in Oregon that are not merchandising but do maintain home service departments to promote dealer sales and give the valuable service to customers.

Mountain States Power Co. employs two full time and two part time home service advisors under the direction of Alta Simmonds. Each range connected, in either a new sale or replacement, is followed by a call. Salesmen training courses are given and public cooking schools held for the dealer in cases where the jobber cannot supply a home economist. The dealer provides the place for the school and, if the power company conducts it, supplies are furnished by the power company. Lighting surveys are being stressed now and the prospects from such are turned over to the dealers.

New Owner Classes Held

Portland General Electric Co. maintains a home service department of seven advisors under the supervision of Phoebe Gillam. Because of the lack of personnel, new owner classes are held in the power company kitchen and "follow up" calls are made only as necessary.

Prospective buyer classes are also held, names for which are received from the dealers, with the schools being held either at the dealer's store or at the power company office. This practice is followed both in Portland and the outside districts. Floor demonstrations and public cooking schools are held in dealer's stores. The home service department does no lighting work.

Indirect Dealer Program

Northwestern Electric Co. has an indirect dealer cooperative program. The home service program, with eight advisors, supervised by Mildred Elrod is conducted almost exclusively through customer contact. Home calls are made to acquaint customers with the newly purchased appliance and to give service in case of complaint. Advisors are loaned, upon request, to dealers to conduct radio programs, demonstrate appliances, instruct dealer salesmen or plan and conduct dealer cooking schools. Dealer classes are not held. Annual cooking schools are held in each of the towns in the territory, to which dealers are invited to arrange displays and bring their customers. Group demonstrations are held at grange meetings and women's clubs at which educational films are shown and electrical appliances used.

Northwestern Electric Co. publishes a monthly magazine for dealers, in which a home economics page is included. A monthly bulletin is issued by the home service department in which recipes and instructions are a part. This is mailed for three months free to all customers who have any contact with the home service department or necessary adjustments.

Dealer promotional work has proven its value in increased sales for 1939, which means increased "load" to the utility.

Since the origin of home service departments, their value has been clearly shown. Sales are promoted, customers satisfied with instructions and demonstrations and real friends made for the power companies, because of service given in the home and to the customers. Home service work is just as important to the customer purchasing from the dealers, or perhaps more so, because power company salesmen are trained to sell electric equipment while dealer's salesmen are often untrained as far as electric servants are concerned.

Home Service Selling Results*

By MARGUERETTE REINHART
Idaho Power Co.

OUR home service advisers make both individual contacts and group contacts. We deal with about 25 per cent of our customers through group contacts. These contacts include cooking schools, demonstrations of cooking, and other electrical equipment, talks, lectures, the showing of slide films, and demonstrations to schools and clubs. The other 75 per cent of the customers with whom we of the home service department work are handled by individual contacts.

There are four types of individual presentations—new customer calls, complaint calls, installation calls and customer coverage calls. First, our new customers are contacted before or at the time they are conected to our lines. If they are receiving service for the first time home service advisers give them information on their wiring, lighting, company services, and other helps. Complaint calls are made on high bill complaints, and complaints on equipment operation. Installation calls are made on all cooking equipment, ironers, etc.

The fourth and most important type of individual contact is the customer coverage call. Lighting demonstrations are grouped in these calls, and occupy about one-third of the time. This direct contact sells the customer on his present use of electric service. We try to show the customer that she is receiving good value for the money she spends for service. It sells against load mortality, and shows the customer that she cannot afford to discontinue the use of any of our services.

About one-fourth of this call is devoted to the selling of increased use to the customer. Half of this part of the story sells the idea of increased use of present equipment. The other half, or

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about 1/8 of the entire call, sells the future use of additional equipment and amounts to pre-selling of equipment.

The sale of future use consists of three parts. First the sale of additional major needs for appliances not handled by our company such as stokers and radios. Second, the sale of major appliances which are handled by our company, such as ranges, refrigerators and water heaters. In either case, a "suspect" or prospect card is handed in by the girl and is given to a dealer for follow-up or developed into a prospect by our salesman.

The third part of this section is the promotion and direct sale of small appliances. Direct selling by the Home Service department is a by-product of our customer coverage calls. In our widely scattered and thinly populated territory 50 per cent of our individual contact expense is in getting the girl into the home. The managements of most companies agree that we can't afford to allow our home service girls to do direct selling unless this selling is a by-product of an individual customer coverage call.

Small Appliance Sale

When a small appliance prospect is located by a girl, it is very easy for her to help the customer with her selection and to close the sale. This sale is either made from merchandise carried in the car or by bringing the appliance on the next trip past the customer's home. This is easily done since customer coverage calls are made in meter route order and the girl will usually be in that same neighborhood for several days. Neither a dealer nor the company can afford the expense or time necessary for sending a salesman to this home to complete the small appliance sale. We certainly can't trust human nature enough to believe that the woman with $5 in her pocket is going to walk past stores full of dresses and hats, which have a much more direct sales appeal, to our store to buy a small electrical appliance in which she was interested several days ago. The actual closing of the sale while in the customer's home takes only a few additional minutes of the girl's time.

This direct selling by our girls has the advantage of keeping up their interest in their work and maintaining the standard of their entire customer coverage presentation. While telling the first three parts of her story, she will find loads which can be developed in the increased use story. There is the constant danger that the individual contacts will turn into visits instead of business calls. We have found that 75 per cent of the girls who are poor in sales are usually poor in other branches of their indirect selling of use and service and in their promotional work. It is an indicator of the girl's ability in all lines of her work, thus giving us an excellent check on the tangible result obtained, as well as a gauge for helping to measure some of the less tangible results.

Keeping Customer Sold

We believe that one of the basic fundamentals of home service work is keeping the customer sold on the equipment she is using. In answer to a questionnaire which I sent out to the girls in our territory each replied that customers to whom they have made a sale, were usually more friendly towards them than others to whom they have sold nothing. This proves that a well-made sale serves as a door opener for future re-selling of present and additional use of electric service.

Now let us see what might happen if our girls did no direct selling. Let us suppose that a home service girl has discovered and promoted a good prospect for a table lamp during one of her customer coverage calls. She tells the homemaker that she will send the salesman out the next day with a lamp for her to see. The girl then goes on to her next call, without having the satisfaction of knowing definitely that the sale will be made.

The next day the salesman takes the lamp to this customer's home—duplicating mileage and expense. The customer might resent this change of personality or she might have decided overnight that she'd rather have a new hat than the lamp. In a good many cases the sale is lost.

Time is lost by the salesman, money for expenses is lost by the sales department—and most important of all, kw.-hr. are lost by the company.

In the Idaho Power Co. in 1939, definite sales quotas in each appliance were set up for each month for every girl. This is the first time a definite quota by year or by months, had been given to the girls. We had small appliance and lighting quotas during short campaigns before, however.

This chart shows you the comparison of results obtained in home service sales in 1938, when no quotas were given, and in 1939, when definite quotas were assigned.

	1938	*1939*
Vacuum cleaners	8	18
Coffee makers	114	95
Toasters	93	143
Hot plates	65	122
Table appliances	176	238
Irons	292	340
Heating devices	75	111
Clocks	115	167
Motor devices	82	115
Globes	2,617	3,619
Portable lamps	615	968
Fixtures	520	986
Mdse. Revenue	$23,468	$31,489

These figures are tangible indication of the progress made in the direct selling phase of our home service program. This combined with our pre-selling, re-selling, and promotional work gives us what we feel is a well rounded and balanced program.

On the questionnaire which was sent to all the girls the question was asked, "Do you prefer having definite quotas set for lighting and small appliances." Eighty per cent of the girls answered yes. This is a clear indication that the girls are better satisfied if they have some definite goal to work for. It was our experience last year that the girls did not merely reach their quotas and then quit selling, but rather, most of them reached quota and then attempted to make as high a percentage above quota as possible. All of this direct selling was, of course, fitted into our regular customer coverage program, as in the overall operations of the home service adviser, a balanced job is to be maintained. No phase of her work should project far ahead of the others. This may happen because naturally some girls prefer promotional work, some prefer to make customer coverage calls, and some prefer selling. The one they favor can be easily detected by a glance at their daily and monthly reports. It is the job of the supervisor to watch for this condition and correct it.

We believe that the inclusion of direct selling into our home service program has four very outstanding advantages.

1. It promotes the enthusiasm and alertness of the girls, and keeps all phases of their total accomplishments at a higher standard.
2. It promotes better living for the customer in our territory, thus creating good-will.
3. It insures more equipment sales for the company and for our dealers—by creating the desire for equipment in our customers.
4. And finally, and most important it decreases the sales expenses and increases the sale of kw.-hr. by the company.

Direct Selling Results*

By AUDREY HERINGTON
Pacific Power & Light Co.

THE Pacific Power & Light Co. serves some 56,000 residential and farm customers in a territory which can be classed as primarily rural. Few towns

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are more than 10,000 populatiton and dealer outlets in many of the small communities are at a minimum. The company actively merchandises residential appliances including lighting equipment on a cooperative basis with dealer outlets.

The home service program, therefore, has as its fundamental objectives: to sell greater use of the present utilization equipment, assist in the sale of additional utilization equipment through company and dealer outlets and to stimulate interest in and friendships for the company so that better utility-customer relations may be developed.

Thus with such objectives and a territory as previously mentioned an "all-service" type of operation seems to be the most desirable. Our operation during 1939 consisted of one home service director and twelve home service advisors; however, again due to our specific problem three advisors were on a part-time basis in respect to home service and others must devote at least ten per cent of their time to other duties. Advisors are located in the 12 district offices and are under direct supervision of a district sales supervisor.

Each home service advisor was assigned the responsibility of counseling with home makers in groups or individually relative to benefits to be derived through the use of electricity as a major household servant and to advise relative to the purchase and use of electrically operated equipment. Specifically, their responsibilities were:

1. To make five home calls per day, three of which are to be calls on customers not previously contacted during 1939 for the purpose of
   a. Making a lighting survey
   b. Demonstrating the use of appliances to new or prospective purchasers
   c. Satisfying complaints
   d. Selling increased use of service already in the home.
2. To conduct group demonstrations, lectures and film showings on lighting and appliances to schools, civic organizations, women's clubs and societies, church groups, shows and fairs, company and dealer employes and sales people.
3. To contact schools in the fall of the year, checking equipment and offering services of the department such as instructions in the operation of present equipment and the showing of educational films.
4. To contact electrical dealers and eye specialists relative to new products and ideas pertaining to the uses of electrical appliances and lighting.
5. Cooperate with all departments and with all dealers rendering prompt home service assistance on request.
6. Assist, whenever possible, with plans for remodeling or building new kitchens with respect to time and labor saving equipment to be installed.
7. Prepare daily reports promptly and keep customer record files up-to-date.

In addition to the responsibilities as outlined each home service advisor was assigned a specific quota for 1939 in customer calls and increased estimated annual revenue to be derived from residential lighting installations. While quotas were not large they gave each advisor a specific goal — something tangible to work toward.

As for results—we are aware of the many intangible results of our home service operation but let us look at a few of the tangible results in 1939.

Total customer calls	11,141
Separate customers called upon	5,513
Number of talks and demonstrations	305
Total attendance	12,901
Lighting installations reported	2,430
Kilowatt increase (net)	913.036
E.A.R. increase	$18,261.95
Approximate cost of equipment (which was largely purchased from dealers)	$37,818.25

And as a direct influence of this program the following lighting equipment was reported sold through dealer or company outlets in 1939 (with aid of regular sales staff, not alone results of home service); I.E.S. Portable Lamps, 15,513; Kitchen Units, Adaptor Type Fixtures and Pin-It-Up Lamps, 15,337.

With such a background of our operation let us consider the topic assigned. First, our program, while we do not discourage direct sales by the home service advisors, is not fundamentally one of direct selling. As stated in the general objectives we are endeavoring to sell additional use of present equipment, assist in the sale of additional equipment through company and dealer outlets and to develop better utility-customer relations. If as a means of increasing use or assisting in the sale of additional utilization equipment the advisor finds that local dealers are not interested and it is opportune to make a direct sale she will endeavor to do so. If local dealers are active in the territory prospects will be referred to the dealer stipulated by the customer.

Through such a program we find that dealer outlets when active are willing to cooperate, advisors are more enthusiastic about their work because they know that if the dealer does not care to consummate the sale they may endeavor to do so and thus render the customer the complete service. Unless utilization equipment is sold either by dealers or the company, the fundamental objectives of the program will not be carried out because good will and increased use of utility services will come only if the customer is satisfied. They will not be satisfied if utilization equipment is not available. Incidental to the program but an advantage of direct selling is that the advisor while on the customer's premises may complete the sale and thus eliminate a follow-up call by another sales representative. Duplicate calls and inefficiency is thus reduced in the general sales program.

In the final analysis, we do not consider our program fundamentally one of direct selling—it is only incidental to our main objectives—a means to an end but with this incidental direct selling we are able to carry out our objectives. The success or failure of our home service operation is by no means measured on the results of direct sales. The evaluation for the most part is in increased customer good will. For it is obvious that the utility can effect its objectives only if in the gaining of these objectives, the customer receives benefits of comparable value.

A Viewpoint on Home Service*

By ETHYL WARREN
Westinghouse Electric Mfg. Co.

I HAVE been asked to discuss the manufacturer's viewpoint of the home service work being carried on in utilities. After your own company's viewpoint, the viewpoint of the manufacturer is considered. You are interested to know what he thinks. You do not as often hear what the manufacturer thinks of your work as you do the opinions of customers, dealers and others concerned. So when any manufacturer has an opportunity such as this, he welcomes it heartily.

You measure your success by your ability to please everyone with whom you come in contact. To do it is no small task, but the fact that home service departments have been maintained in utilities for several years and each year your duties have increased, is proof of the need of home service, its value to everyone and your individual success. Your willingness to cooperate in solving the selling problem which the manufacturer has is realized and appreciated. Without your support this task would be much harder.

Because of your interest and ability, your duties have increased from the simple one of telling customers how to operate an electric range, which was all that was expected of you in the begin-

* *A report of the Home Service Committee.*

ning, to a full program now, not only of instructing users about ranges but all appliances, actually selling them at times, and forever thinking of ways to create new markets.

These increased duties have meant application to your work and constant study to keep abreast of all developments, which in this industry have come faster than in almost any other. Your accomplishment is worthy of praise.

Goal Is the Same

In contacting these departments of the utility a manufacturer's representative finds that they do not always function alike in every respect, but he is soon aware of the fact that their goal is the same in each case. And, whether the work carried on is in the line of active selling or indirect selling such as cooking schools, sales floor demonstrations, sales training work, broadcasting, or just a home call, the manufacturer realizes these activities help greatly in making sales. Not only that, but in analyzing the results of this work we have definite proof of its benefit to the consumer, and the utility, as well as the manufacturer.

Let us review some of these benefits. Before home service departments were established, if the homemaker needed instruction about using an electric range it was given by a manufacturer's representative. Often Mrs. Homemaker had to wait until this representative came into the district. Today the utility home service departments are doing this without delay.

Range Instruction

And, speaking about these calls—in several utilities where home service work is being carried on with outstanding success, we find that an especial effort has been made to see that each new user of an electric range reads and thoroughly digests the first pages of our range instruction book, where full information about its use is given. These home economists have realized that in following this plan they have helped themselves and their companies by minimizing home service calls, but there is also a benefit to the manufacturer. The consumer who likes her range is the best advertising medium he has, and of greatest importance to you, it creates a good feeling toward the utility which reflects right back on you.

In several utilities, instruction classes in the use of electric appliances are being conducted regularly each week. The benefit of this to the consumer is proven by the attendance. It was only a few years ago that it was necessary to offer inducements in the way of door prizes to get more women interested in cooking schools. Today, through the effective work of your organizations, this picture has changed. Recently I visited one of these classes and saw 52 women there. Many of them had attended three or four sessions. As nothing was offered in the way of a door prize to induce them to come, this attendance proved their interest. They wished to learn about modern methods of cooking. It is interesting to know that these classes are not advertised in any way except that an invitation is offered when the range is sold or given to a prospect when she contemplates the purchase of electrical equipment.

I wish to add that the dealers in this district are invited to send their prospects and customers to these classes and they use the privilege for they know that the attending home economist will show real interest and give capable advice. This pleases the manufacturer.

Public Administrations

Many utility home economists have taken our part of the work of conducting demonstrations for the public on all appliances. Very often this is done for a dealer of traffic appliances as well as the major ones. Records of sales from these sources which come to the manufacturer's attention show that you are doing outstanding work in this line. Manufacturers appreciate the fact that you are likewise willing to cooperate when and where needed in selling his traffic appliances.

Speaking again about the benefits of your work to your own companies, it would seem that your opportunities of creating closer public relationship are greater than in any other department. It is very apparent that you, the executives who are here today, are choosing the personnel of your department with care to get capable representatives with personalities to fit into the communities in which they will work.

As for the manufacturer's viewpoint, you form a vital link between the ultimate consumer and the manufacturer of the appliances. You can assure its effective and satisfactory use. And, in summing it all up, we as manufacturers are certain that you are one of the most necessary agents in the increased acceptance of our products and are very grateful for the help you are giving us.

Ideal Home Service Program*

By AUDREY HERINGTON
Pacific Power & Light Co.

HOME service is a part of a well planned sales program by company executives who believe in the importance of home service in relation to its value to the company. From the top executive right down the line to the women who must execute the program of the department, the successful operation of any home service program, like any other utility sales effort, must be based on a well planned program. It is essential that the functions, duties and responsibilities of the home service group be defined and formally approved by the sales manager.

There is a very definite trend toward "All Service," and with this increasing trend, we do have to build or originate these objectives, around our program. It is appropriate therefore, to examine briefly the nature of the program, or present needs, and to consider current sales methods and results from the standpoint of our adequacy in meeting such needs. A program would need to be planned, revised and remodeled to fit the objectives of each individual home service department and also fit the needs of the community in which it functions. With this planned and executed program, there must be adequate supervision and plenty of woman power. The greater the organization—the greater the activity and the wider the influence on a greater number of people.

Home Service Personnel

The home service organization should consist of a home service director, a supervisor when necessary and home service advisors. The functions and duties of the home service director should be distinctly executive in character, and it should be the "business" of the home service director to coordinate all the work of the department and to direct the year's plans through her coworkers—the home service advisors—whom she will help select and train; to check carefully all department program records; to see that results are obtained as anticipated and to take charge and to prepare material for all public programs such as radio and other group programs, when one is to be conducted.

It is advisable there not be more than ten or twelve advisors working under one supervisor. Where the group exceeds this number, it is well to have an assistant or two, to lend assistance. All contacts between the director and the supervisor should be made through the division manager. This practice insures unity in the operation of the department, and can be made especially effective in our own organizations by working with our salesmen, servicemen, commercial, farm and all others.

Home service advisors should do the greater part of the active field work of the department. They make all home calls for instructions in the use of equipment and in lighting, except in

** A report of the Home Service Committee.*

special cases where problems require the help of the supervisor. These advisors will be trained to give sales floor demonstrations for the company and for the dealer. The dealer is given instructions in the operation of the equipment that he has to sell, and by being familiar with its advantages he is in a position to do a more complete selling job. He is able to offer his customers an extra service through demonstrations that often determine the closing of sales. Home service advisors will give group demonstrations, classes and lectures whenever possible and assist in the selling of all our services. Through contacts made with the dealer and his customer, the home service organization develops more acceptance of her company, which builds that intangible asset known as good will. Advisors must be instructed in an understanding of the operation of rates established by the company and be able to explain domestic rates to the customer.

Selection of Advisors

In selecting home service advisors, their qualifications should be based on the following: personality — appearance — background — adaptability — training and experience. They must have the personality that is known as the "Million Dollar" kind—an appearance that will cause the housewife to recall her own girlhood days—the background you want your children to have—the patience of Job—the adaptability and technique of a diplomat and the training that makes her conversant with foods, diets, home problems, world affairs, company policies, rate structures, athletics, infant psychology, dressmaking, millinery, etc., ad infinitum! She must be in short, a combination of brains and beauty, and a background and backbone, ability and adaptability, be diplomatic and dependable. She must understand human nature without becoming calloused or sour from contact. She must love her work and her fellowmen.

The importance of training new personnel thoroughly and establishing desirable viewpoints and working habits from the very beginning, is vitally important to the creation and maintenance of successful home service work. It should be emphasized also that part of the initial training is attention to subsequent training and education by selfties offered by the utility such as schools, meetings and sales training courses.

The training job is never completed. Subsequent training that is necessary to the home service group is equal in importance to the initial training. Initial training should be at least for one month under the direct supervision of the home service director. At the end of her training period, the advisor should be entirely familiar with the operation of all domestic appliances, the Better Light-Better Sight program, her organization, and be at complete ease.

Ways of Utilizing

There are many ways of utilizing the advisor's method of education and promotion, varying with the company policies, location, classes of consumers and utility problems and transportation. The following outline indicates a number of variations, one or several of which have been successfully used:

1. Conduct group demonstrations and lectures to both large and small groups, such as prospects, cooking school groups, womens' clubs and societies, servant schools, church and school groups, shows, fairs, recreational groups, company and dealer sales people and employees.
   a. To advertise the use of electrical equipment and light conditioning.
   b. To create a desire for electrical equipment and improved lighting.
   c. To promote the additional use of equipment already installed.
2. Calls on individual homes to instruct in the use of equipment and create the desire for additional equipment. To give lighting demonstrations and build the sale of lamps and fixtures.
   a. Convert new users into satisfied customers.
   b. Restore unused energy by satisfying complaints and selling increased service already in the home.
   c. Develop prospective uses and users for additional services.
3. Radio programs under the direction of the home service group will carry this type of advertising in dramatic form to many women who cannot attend group meetings. Such advertising, as we all know, goes right into the home while a woman is doing her housework and reminds her of the many conveniences she does not already have and those she does have, to make her day more pleasant. Such radio programs capture the imagination of the housewife and stimulate interest in the job of homemaking and should include:
   a. Menu planning
   b. Remodeling outdated kitchens
   c. Planning an all-electric home laundry
   d. Re-styling the home lighting
   e. And how about lighting that garden!

In order to carry out the above suggested ideas for the Ideal Home Service Program, the following equipment is necessary. It is suggested that a model kitchen be installed in each office. This gives the home service department an ideal opportunity to be invaluable to dealers, customers and employees, for after all, these are the groups to which our entire activities are directed.

Adequate transportation is an important factor, closely related to make customer coverage, and one worthy of particular study by every utility and involves the provision of adequate and economical transportation facilities for home service advisors. Failure to provide some means whereby contacts can be conveniently made—particularly in scattered areas—handicaps the development of the home service program.

Special conferences should be held at least once or twice each year, where the home service advisors may come together for new helps and ideas and to renew their faith.

The evaluation of a department is dependent upon adequate, accurate records and a sufficiently supervised check to establish the facts indicated. Direction and supervision would largely be based upon intangibles, were it not for the measuring facilities afforded through the use of records and reports. Daily reports and monthly summaries furnish a definite guide to the home service representatives in taking stock of individual accomplishments, as well as supplying tangible evidence of ability, progress and value to the company. And so, it is important from the management standpoint that these reports be submitted so they may have a clear picture of the home service department's accomplishments.

Summary

In summing up the ideal home service program, I believe we should not lose sight of the real purpose of the home service program:

1. To supplement and support all residential sales activities.

2. To improve customer-dealer and employe understanding of the value and cheapness of the use of the utility service . . . and

3. To increase the use of utility services generally, as well as by dealers and other allies, through greater appreciation of its value to their business and to their homes.

4. The ideal program on a broad basis means making our work so familiar to the women of our territory that they turn to us for all help in home making problems.

Commercial and Industrial Sales Bureau†

1939 Commercial Sales Survey*

By C. T. BAKEMAN
Puget Sound Power & Light Co.

TABLE I on p. 99 shows kw. of load in the commercial field added on the lines of 14 member companies of the Association broken down into types of load. Table II shows the estimated annual revenue added by these increases. Table III gives the set up of the sales organizations by which this business was secured and Table IV summarizes the results on a per-salesman, per-customer and per-kw. basis.

* Report of the Commercial and Industrial Sales Bureau.

Adapter Lighting Units to Low Users

BY M. R. LUND,
The Washington Water Power Co.

CHIEF objective of all commercial sales campaigns in the past has been that of securing the greatest amount of increased revenue with a minimum of cash expenditure during a given period of time. This, of course, is of vital importance to our industry if it is to survive the ever increasing obligations with which it is confronted today. The success of a campaign of this nature is determined by the number and size of electrical units that the customer installs during this period.

Since the number of sales determines the winner of the sales campaign, the commercial salesman naturally concentrates his time on the larger commercial customers. Contacting this class of customer usually produces the maximum results with a minimum of time and effort. The small or so-called "low-use" customer is seldom contacted because of financial inability to purchase equipment or no need for as elaborate an article as we are trying to sell. Whether we are justified in making this assumption or not, the truth is we all do, with the result that this class of customer is more or less neglected.

We are all aware of the fact that any campaign directed exclusively to the "low-use" customer will produce small financial results as compared with those of our regular campaigns where all-service selling to all customers is the program. Then why should we engage in an activity of this nature which appears to be so non-productive? It might be presumed that a "low-use" customer campaign is a gross waste of time and money, and that much business is lost because of the lack of contact with the larger customer during this period. Is there any sound logic whatsoever for an activity of this nature?

To answer these questions intelligently and find the justification for a campaign which appears to have so little merit, we must analyze conditions and circumstances as they affect our industry today. It is a program with a long range perspective rather than one producing immediate tangible results.

Today being a new era in the life of the privately-owned electrical utility we are confronted not only with the problem of ever-increasing financial obligations but also we are confronted with the more serious problem of self-preservation. We cannot solve the latter problem alone. We must rely on our friends for aid. The best way to make friends for the electrical industry is to create in the minds of our customers, a true understanding of the sincere and honest methods under which we operate and the consistent service and reasonable rates that have been made available to them. Most of our larger consumers are aware of and appreciate the above facts and realize that the electrical industry is doing a splendid job. However, there is some doubt that our "low-use" customers (and 40 per cent of our commercial customers are in this group) appreciate our services. In other words, they are not a group on whom we can depend when we need help.

We must not over-look the fact that the average business man's opinion does much to mold the minds of his family, subordinates and friends with reference to politics, civic affairs and even our own affairs. Therefore, it is imperative that we render the same courtesy and consideration to our "low-use" customers as we do to the others. A lack of this service may be the very reason why many of our customers are in the low-use class today.

† J. A. Lockhart, Pacific Power & Light Co., chairman; A. H. Greisser, Portland General Electric Co., vice-chairman; B. C. Electric Railway Co., E. E. Walker; The California Oregon Power Co., D. A. Runyard; Eastern Oregon Light & Power Co., Raymond Gray; Idaho Power Co., O. C. Mayer; The Montana Power Co., R. E. McDonough; Mountain States Power Co., H. E. Farris; Northwestern Electric Co., J. C. Plankinton; Puget Sound Power & Light Co., C. T. Bakeman; Utah Power & Light Co., L. B. Gawan; Washington Gas & Electric Co., E. J. Ludeman; The Washington Water Power Co., M. R. Lund.

Now we have the real justification for an adapter unit campaign to "low-use" customers. There is no better way to accomplish our chief objective than by personal contact in the customer's shop or place of business. Some sort of a definite sales campaign directed to these "low-use" customers offers the best opportunity of meeting these people and selling the utility to them.

This campaign should be conducted through our regular commercial representatives who are thoroughly familiar with company operations, policies, rates and equipment and whose normal functions are those of being the major connecting link between company and customer.

To conduct successfully a campaign of this nature, it is necessary:

1. To establish a net revenue or a kw. connected quota which should result in low-use customer coverage.
2. To sel a low priced adapter type lighting unit which can be readily demonstrated and installed without any additional wiring expense to the customer.

When all "low-use" customers have been contacted and told the true story of our industry, then we shall have created in their minds a better understanding of our industry, its problems, its operation, and a greater appreciation of the value to them of the services which we render. We should tell the functions of the company, give a detailed explanation of our cheap electric service and the numerous ways in which these will be helpful, and try to sell, by demonstration, adapter type units or some other fixture or appliance.

The question is asked "Is a campaign of this nature a loss of business to us?" The answer is definitely "No" because if a campaign is properly timed for the period immediately after the first of the year when business is at its low ebb, there will be little major business lost and some "plus" business created. Many of these "low-use" customers that are being sold today will be our major customers tomorrow. Why not develop their friendship and respect now and by so doing, their friendship may be most valuable at a time when it is most needed.

A campaign of this nature was presented to the commercial representatives in order to prove their ability as real creative salesmen. In brief, an adapter lighting unit campaign to the "low-use" customer, if properly timed and conducted, should be most valuable because:

1. It creates more friends for the industry.
2. It is real selective selling because no capital expenditure is required to care for the additional load.

Table I — Commercial Load Added 1939

(14 Companies—Northwest Electrical Light & Power Assn.)

Company Number	Commercial Customers	Food Serving Comm'l Custs.	Kw. Added Load: Lighting	Cooking and Baking	Water Heating	Heating	Ventilating and Air Condition	Motors	Total Kw. Load Added
1	23,125	1,200	3,291	3,383	199	474	81	3,821	11,249
2	16,227	250	3,519	400	19.4	162.3	..	8,530	12,631
3	11,193	1,100	828	1,282.3	225.0	253.2	20	...*	2,608
4	10,808	832	2,192	583	147	295	47	298**	3,562
5	10,460	1,126	4,130	1,775	171	228	265	865	7,434
6	9,237	656	2,393	2,176	449	****	302	1,401	6,721
7	8,278	550	1,728	1,063	270	268	 153	810	4,292
8	7,888	600	619	1,410†				319	2,348
9	5,696	600	1,488	284	No record	208	11	384	2,375
10	6,500	400	980	1,124	200	100	100	200	2,704
11	1,095	...	200	106	40	35	50	450	881
12	No commercial activity.								
13	Commercial sales part time responsibility of New Business rep. and Operating Dist. Mgrs. No complete data available.								
14	Combined with domestic sales. Record not segregated.								
Total	110,507	7,314	21,368	13,586.3	1,720.4	2,023.5	1,029	17,078	56,805

* Not considered promotional. ** Also includes refrigeration. *** Also includes government and municipal. **** Included under Motors and Misc. and Refrigeration. † Includes all load except lighting and motors.
NOTE: Totals on segregated figures do not include figures for companies not having segregated detail.

Table II — Estimated Annual Revenue from Load Added (Table I)

Company Number	Estimated Annual Revenue Added: Lighting	Cooking and Baking	Water Heating	Heating	Ventilation and Air Conditioning	Motors	Total EAR Added	Sales Results Included (See Code)
1	$131,668	$ 42,522	$ 3,451	$ 9,123	$2,446	$102,888	$ 292,098	B, C & E
2	105,570	9,600	450	4,008		171,354	290,982	B & D
3	25,972	24,656	3,475	1,874	400	...	56,377	B, C & E
4	Revenue Figures not segregated						108,498	B, C & E
5	175,169	48,040	2,637	6,471	8,848	17,017	258,182	A & D
6	119,670	54,400	8,975	....	7,555	55,591	246,191	A & D
7	83,436	24,795	6,785	6,299	4,350	17,934	143,599	A & D
8	16,041	25,609				8,013	49,663	B, C & E
9	74,395	5,670	...	6,252	660	10,999	97,976	A, C, D & E
10	31,360	20,232	2,268	500	500	1,000	55,860	A & D
11	10,000	2,650	1,000	875	1,750	9,000	25,275	?
12								
13								
14								
	$773,281	$258,174	$29,041	$35,402	$26,509	$393,796	$1,624,701	

CODE—Sales Results Include: A. Commercial sales only. B. Commercial and small industrial. C. Only sales initialed by utility salesman. D. Also all dealer contractor sales. E. Strictly incremental from promotional activity—does not include gravity business.

Table III — Commercial Sales Organizations

Company Number	Commercial Sales Organization Full Time Specialized Salesman: Lighting	Cooking and Baking	Water Heating	Ventilation and Air Condition	Heating	Motor	All Service Salesmen	Part Time Commercial Salesmen**	Total Equiv. Full-Time Commercial Salesmen**	Utility Merchandise Equipment (See Code)
1	1	1	..	..	..	..	9	4	12.75	C
2	4	..	..	..	..	3	..	1	7.5	None
3	2	1	..	1	..	..	..	9	9	None
4	..	..	..	..	..	..	12	..	12	None
5	..	..	..	..	..	..	14	5	16	A, B & C
6	..	1	..	..	..	..	15	..	15	A, B & C
7	..	..	..	..	..	..	10	6	11	None
8	..	..	..	..	..	..	10	..	10	B*
9	5	..	..	..	..	..	..	6***	7	None
10	..	..	..	..	..	..	3	..	3	B & C
11	..	..	..	..	..	..	..	4	2	A, B, C, D, E, F & G*
12	..	..	..	..	..	..	..	..	..	..
13	Handled by New Business Representative and Operating District Managers							..	..	..
14	..	..	..	..	..	..	..	..	..	..
Total	12	3	..	1	..	3	73	35	105.25	

* Partial merchandising. ** Unless otherwise stated, part time men are considered 50% on commercial sales. *** Part time on industrial.
Utility Merchandising: Lighting, A; Cooking and Baking, B; Water Heating, C; Ventilation, D; Air Conditioning, E; Heating, F; Motor Equipment G

Table IV — Summary of Results of Commercial Load Building

(Average figures given only for companies reporting corresponding segregated figures)

Company Number	Comm'l Cust. per Food Serving Establishments	Comm'l Cust. per Equiv. Full-Time Salesman	Comm'l Kw. Added per Equiv. Full-Time Salesman	EAR per Equiv. Full-Time Salesman	KW Added per Comm'l Customer	Estimated Annual Revenue per Kw.: Lighting	Cooking & Baking	Water Heating	Heating	Motors	Total
1	19	1,813	882	$22,909.	.49	$40.	$13.	$17.	$19.	$27.	$26.
2	64	2,163	1,684	38,678.	.78	30.	24.	23.	25.	20.	23.
3	13	1,243	290	6,264.	.23	31.	19.	15.	7.	..	22.
4	13	900	297	9,041.	.33			Not Available			30.
5	9	653	465	16,136.	.71	42.	27.	15.	28.	20.	35.
6	14	615	448	16,412.	.73	50.	25.	20.	*	40.	37.
7	15	752	390	13,054.	.52	48.	23.	25.	23.	22.	33.
8	13	788	235	4,966.	.30	26.	18.	**	*	25.	21.
9	9	813	339	13,996.	.42	50.	20.	..	30.	29.	41.
10	16	2,166	901	18,620.	.42	32.	18.	11.	5.	5.	21.
11	Not available	547	440	12,637.	.80	50.	25.	25.	25.	20.	29.
12	No data available.										
13	No data available.										
14	No data available.										
Total	15	1,049	539	$15,429.	.51	$40.	$20.	$18.	$20.	$24.	$29.

* Included in motors and misc. refrig. ** Included in cooking and baking.

3. It produces a greater net return per kw.-hr. sold, as all energy sold is from the upper brackets of the rate.
4. It definitely paves the way for future sales.
1. It produces plus revenue, which otherwise would not be realized.
6. It should not materially affect securing business from larger customers, if properly timed.
7. It will offer the commercial salesman an opportunity to prove his ability at real creative saleswork.

An adapter lighting unit "low-use" customer campaign is now being conducted by our company. It is at its half way mark both as to time and accomplishment. Estimated annual revenue to be secured per commercial salesman during this sales period is but $400 net increase. We believe our revenue quota will be reached, even though the revenues to be derived from the activity will be small as compared with that of other type campaigns. We are confident that the many other advantages gained therefrom will more than justify the time and money expended in its accomplishment.

Report on 1939 Industrial Business

BY J. D. SCOTT,
Portland General Electric Co.

FOR a number of years the Central Station industry has been compiling reports for its own benefit in which it has classified its various customers under the general headings of domestic, commercial and industrial business. An examination of these reports and of the numerous rate schedules offered by the various utilities discloses the fact that there is no unanimity of opinion about these classifications, and that the distinctions between them vary considerably even among two or more utilities operating in the same territory. This is particularly true of the terms "commercial" and "industrial" business, many of the smaller companies lumping them together under one classification so far as billing schedules are concerned.

SCOTT

It therefore seems pertinent that we examine what we mean by these terms and try to reach an agreement concerning them so that hereafter we will all be talking the same language and embrace the same classifications in the words we use.

There is very little disagreement as to what "domestic" means. It implies a residence, a place of living for one group of related people, whether it be a house, a flat or an apartment. It does not imply a place of business or manufacture.

Classification?

However, when it comes to classifying just who is a domestic customer entitled strictly to residential rates, what about doctors in outlying suburbs and small towns, with offices having therapeutic machines and x-rays in their homes, small job printers and mechanics with shops in their basements, and numerous neighborhood tradesmen who live in the back of or over their stores? All too frequently such places are wired with but one service entrance and one meter. What rate shall they receive as compared with similar places of business located in downtown office and store buildings?

The largest of all these commercial off-shoots from the strictly domestic customer is the rural residential and farm service class. Here we frequently encounter half a dozen different kinds of service going through one meter; lights for house, barn and sheds, power for pumps and silo, heat for range, milk can sterilizer, soil cable, incubator, and what not. And not infrequently the farmer gets all these services, up to certain definite limits of load at substantially the same rate schedule as in-town residences where population is dense. Is the farmer a "domestic" customer, or is he not?

This is not an attack on the application of rates. It is merely a question of proper classification. However, classification may become a very important matter in view of government regulation and competition with business.

Some years ago when Congress passed the law placing a 3 per cent tax on the sale of electric energy by private utilities, it was specified in the Act that "industry" was to be exempt from such taxation. At once the question arose among the utilities, exactly what is an industry? The Federal Power Commission gave a rather general definition involving production of raw materials, manufacture, processing, etc., which later was modified by some hair splitting distinctions between wholesale and retail, but on one point it was crystal clear. Not less than 80 per cent of the electric energy used in any business must be used in manufacturing in order to gain exemption from taxation for all the energy used in that business. Below that percentage the industrial or manufacturing use must be separately metered to escape taxation. If not separately metered the entire energy used is subject to the tax.

Bearing all of the foregoing in mind, the following basic definitions are suggested for the two classifications of Industrial and Commercial concerning the use of which there appears to have been no clear cut distinction in the past. At least the previous reports and rate schedules used in this Association indicate a considerable overlap.

The word *Industrial* implies:

1. The production of raw materials from nature, exclusive of agriculture and fishing.
2. The manufacture or processing of raw materials into parts or finished products.
3. The assembly of individual parts or products into a finished product.
4. The repair or maintenance of equipment, in which machine work is a major factor.

The word *Commercial* implies:

1. The sale of services or commodities.
2. The storage (without processing) of commodities.
3. The transportation or transfer of commodities from one place or one party to another.
4. Th catering to the physical, mental, aesthetic or moral pleasure, use, convenience and necessity of the general public in any and all forms.

In order to illustrate the confusion between these two terms so far as the application of industrial and commercial rate schedules to individual customers are concerned, allow me to cite a few examples common in the Portland area. These hair line differences in classification have grown up through custom, usage and expediency and can probably be paralleled in any other city in the Northwest.

(a) All forms of the printing business, including newspapers, are entitled to billing on industrial schedules.
(b) Radio broadcasting stations are the only sources of amusement or instruction that receive industrial rates.
(c) Retail baking, restaurant and institutional food cooking are considered commercial. Wholesale bakeries are industrial.
(d) Laundies takes an industrial rate.
(e) Ice making and wholesale refrigeration plants receive industrial rates, but retail refrigeration takes commercial.
(f) Water heating, excepting domestic and that used in a manufacturing process, is classed as commercial.
(g) Air heating to maintain human body temperature, is considered commercial; air heating for processing products is industrial.
(h) There is also a distinction between water pumping for irrigation and drainage, and water pumping for a community domestic supply. And so it goes.

In most states it is the obligation of the utility to give the customer the best rate schedule to which his class of business may be entitled regardless of whether the utility chooses to list him as an industrial or a commercial customer. Thus, it comes about that some purely industrial customers may be receiving commercial rates, and vice versa.

This now brings us to a discussion of the progress made by the member companies of this Association in industrial

Northwest Electric Light & Power Assn. Report Industrial Business Added 1939

Company Number	Total Customers Com'l	Total Customers Indust.	INDUSTRIAL POWER Gravity Kw.	Gravity E.A.R.	Promotional Kw.	Promotional E.A.R.	INDUSTRIAL LIGHT Gravity Kw.	Gravity E.A.R.	Promotional Kw.	Promotional E.A.R.	INDUSTRIAL HEATING Gravity Kw.	Gravity E.A.R.	Promotional Kw.	Promotional E.A.R.	LOAD TAKEN FROM Competing Fuels Kw.	Competing Fuels E.A.R.	LOAD LOST TO Competing Fuels Kw.	Competing Fuels E.A.R.	NUMBER SALESMEN On This Work Full Time	Part Time
1.	15,376	2,560	4,780	$ 95,600	3,740	$ 74,800	469	$14,070	234	$ 7,020			60	$ 1,200	555	$11,100	15	$ 300	4	1
2.	1,200	20	385	$ 25,000			20	$ 1,200			10	$600			None		None			4
3.	5,908	1,169	No record of strictly industrial business available.												None		None		(Com'l & Indust.) 10	100
4.	No record				218	$ 15,600			84	$ 2,940			63	$ 1,526	320	$ 8,960	28	$2,464		10
5.	5,696	572	682	$ 6,820	2,880	$ 28,800	74	$ 2,576	198	$ 6,923	24	$976	155	$ 6,192	150	$ 1,500		None	2	4
6.	8,278	553	595	$ 13,350	2,370	$ 53,420	20	$ 840	175	$ 7,590	5	$110	35	$ 810	260	$ 5,860	55	$1,260	2	20
7.	L.—11,198 P.— 2,787	616	4,326	$ 67,375	1,290	$ 16,960	Included in Power		58	$ 1,121			233	$ 5,927	1,290	$16,960		None	2	4
8.	22,672	640	No record kept separate from commercial business.										474	$ 9,123	1,071	$14,319		No record	Industrial 1 Com'l & Indust. 10	5
9.	10,446	1,922	See Promotional		Includes gravity business 6,872	$208,060			525	$17,113			165	$ 3,886	220	$ 6,650	7.5	$ 300	8	8
10.	9,288	599	12,282	$185,218	100	$ 2,500	76	$ 1,605	100	$ 2,110	9	$387	80	$ 3,380	No record		No record		2	
11.	6,598	105	360	$ 33,000	No separate record kept of industrial business.								Commercial 1,000	$18,000	200	$ 5,400		None		5

Total Industrial Business Added — 45,226 Kw., $945,728 E.A.R.

power, lighting, and heating for the year 1939. The tabulation herewith exhibited represents eleven answers to a questionnaire sent out to sixteen member companies of this Association. The main classifications are Industrial Power, Industrial Light and Industrial Heating, followed by data on Load, taken from and lost to competitive fuels. For purposes of comparison, the total commercial and industrial customers are shown for each utility, as well as the number of men assigned by each to developing industrial business.

Gravity business is literally business that falls into our laps without benefit of salesmanship. There is a tendency on the part of all salesmen to feel that they had to do some work for any piece of business turned in. However, a little reflection will tell you what gravity business is. It is business due to expansion in customer plants either enlarging former operations already being served, or branching out into some new field. Also, it is gravity business when a factory moves from one town to another and brings along its electrically-served equipment intact.

Promotional Business

On the other hand, promotional business is load you had to work to get. Either you battled some other utility salesman for it, or the gas, oil or steam men, or you simply had to convince the management that the electrical way was in the long run, the best way. Preconceived prejudices for or against some form of power, are often the toughest things a sales engineer has to combat. In any event, every salesman knows without question when he has landed a piece of promotional business.

One of the promotional jobs for which the power engineer receives the least credit if he succeeds, and the most hell if he fails, is retaining a piece of business against the bid of competitive fuels. However, the man who calls you in to meet the bid of competitive fuels is not to be too greatly feared. Usually he is looking for concessions and will stay with you if you are able to give a little ground. It is the man whose mind is made up and who lays plans for a change of power without notifying the utility that is the power engineer's nightmare.

Referring to the tabulation appended, the columns headed kw. refer to connected load added to the system, and E.A.R. stands for the estimated annual revenue of that connected load. It is obvious that those companies serving the larger centers of population should have the greater number of industrial customers, as defined herein, whether the companies bill them under industrial or under commercial rates. Some companies, of course, make no distinction between industrial and commercial business so far as rates are concerned.

If we exempt the wholesale baking and cooking industry, the least developed of our potential markets is the industrial heating field. It is also the most highly competitive because of the prevalence of other cheap fuels. The sale of large blocks of industrial heating requires special treatment and special selling technique with the sales engineer and the equipment salesman doing the prospective customer's engineering for him. A glance at the table shows that approximately 1,300 kw. of industrial heating, as herein defined, was taken on by the utilities of the Northwest during 1939.

Industrial lighting, which I take to mean the better lighting of factories and their offices, is showing a marked pick-up. The continuous campaign put on by the lamp and fixture manufacturers has been of great aid to the utilities in making the public more light conscious. The results of this education are reflected in the increasing number of plants where better lighting has been installed to increase production and decrease spoilage and accidents. Intensified sales effort should increase, by a substantial percentage, the 2,000 kw. taken on this year.

I hope to live to see the day when industrial power will sell itself and be practically all gravity business. However, the impossibility of achieving such a Utopian idea is considerably offset by reflecting that last year we snatched more than 4,000 kw. from the jaws of competing fuels.

Recently two large industries signed for service with the Bonneville Administration for approximately 30,000 kw. each. Both of these industries will be located on the north bank of the Columbia River adjacent to the city limits of Vancouver, Washington, and both plant sites lie within a mile of the main Bonneville transmission tower line where it spans the river from Washington into Oregon. Ground is now being surveyed for the erection of buildings.

The first is a refining plant of the Aluminum Company of America in which aluminum oxide from the Gulf States will be shipped by water via the Panama Canal and then reduced to aluminum pig. The second plant will be an ore smelter of the Sierra Iron Co. Hematite ore from the Scappoose region of Oregon, about twenty miles down river from the plant, will be used and the smelting will be accomplished entirely by electric furnaces. Obviously, both of these plants will operate practically continuously, and use large quantities of kilowatt hours. Now, pig iron and pig aluminum in large quantities will probably attract a number of refining and fabricating plants to this area, and this is where the private utilities will get a chance to have their innings.

The trend of our industrial business in the future, as I see it, should be upward in spite of the Government and PUD competition. At present Bonneville is offering a basic rate at any point on its present and future transmission network of $17.50 per kw. yr. This is, of course, a very low rate if energy is used continuously (100 per cent load factor) at a fixed demand or peak load. However, only very large industries that normally operate at a very high load factor can use this rate to advantage in comparison with purchasing energy from a large utility. The reason for this statement is as follows:

A recent study of 400 industrial accounts in the Portland area showed that under the present Wage and Hour Law, they are operating on an average load factor of 25 per cent. This figure checked very closely with figures compiled for the State by the Oregon Mineral Industries Bureau. On a 25 per cent load factor basis, a $17.50 kw.-yr. rate (at 100 per cent load factor) becomes four times as much, or the equivalent of $70 per kw.-yr. Reduced to kilowatt hours, this means a rate of approximately 8 mills. It is not yet known how far Bonneville will go in providing stepdown transformers for its customers, but while it appears probable they will install transformers cutting from 110,000 volts to some intermediate voltage, it seems likely that the customer will have to provide his own distribution transformers and connecting transmission line from the plant to the nearest Bonneville substation. By the time all this investment is made, the average sized industry's rate may work out to be nearer 9 mills than 8 mills. The private utilities are already selling many industrial customers in the Northwest on rates that net less than 9 mills per kw.-hr. for the year. So except in special cases as noted above, Government competition may be limited to very large industries.

At least two of the member companies of this Association have found that subscriptions for the benefit of their customers to the monthly magazine, "*Electrified Industry*," have proved an excellent means for promoting timely ideas in industrial applications of electricity. Power salesmen were delegated to call on each manufacturing plant that seemed a likely prospect, to present the first number of the magazine and to get the name of the man to whom the subscription should be sent. After four months the salesmen were sent back to get the customer's reaction, which in the large majority of cases, was very favorable. Thereafter, the subscriptions were renewed for a year. From time to time additional customers were placed on the subscription list, and to date the results, judging by the inquiries, have justified the expense.

Other magazines which play up industrial heating are "*Chromalox News*," —"*Industrial Heating*," published by the National Industrial Publishing Company of Pittsburgh, and "*Electric Heat in Industry*," put out by the General Electric Co. All of these publications can be used with good effect in educating manufacturers to confer with you about their heating costs and problems. Working examples of nearly every form of common electrical heating applications can be found, as well as many others that most of us in this area are unfamiliar with.

In conclusion, may I again call attention to the need of the utilities in the Association agreeing to a uniform classification of their industrial and commercial customers, so that tabulations similar to this one may more properly indicate the trends of our business and thus lead to better planning of business-getting campaigns. The general tone of the letters received with the questionnaire was that all the member companies are girding their loins to go after more industrial business without particular emphasis being placed on power or lighting or heat. Perhaps the emphasis will vary with different companies but in any event, the continuation of this study next year should be far more revealing than the somewhat mixed data herewith compiled.

Commercial Sales Training

BY O. C. MAYER,
Idaho Power Co.

IN laying a basis for this discussion, your committee has prepared a questionnaire which was replied to by ten of the major companies in this association. I would like to review a general summary of the questionnaire.

I would like to point out that on the average, each commercial and industrial salesman is responsible for 1,066 customers. This is based on ten companies reporting.

Two of the companies did not report on revenue. Therefore, figuring on a basis of 8 companies, we find each man is charged with the responsibility of looking after $463,000 of business. I appreciate that others are involved in bearing the responsibility for holding present and securing added business from these customers. But the commercial and industrial salesman is the one individual directly responsible for contacting, retaining, and building load with this amount of business. You will agree that a salesman bearing this responsibility is in need of all the sales training and help that it is possible to secure. Compare this figure with the man-power in the residential field per dollar volume, and it must be conceded that the commercial-industrial salesman has a man-sized job.

The first thought entering one's mind might be the question of adding more man-power. I agree that added man-power may be desired, but in many cases man-power has been added when what is needed is more volume per man. I am referring now to the building up of the customer's kw.-hr. use so as to off-set rate reductions, to provide for further rate changes and reduce the customer's cost per kw.-hr. But whether it be added man-power or increased efficiency of present man-power, more efficient salesmanship is needed and that can be supplied only by more intensive sales training.

Let us look into what your committee has to recommend, in view of what is now used for sales training, and what is generally available for sales training. With this thought in mind, the following has been set up suggesting what general sales training for commercial-industrial salesmen should include: The following is but a brief outline of the salient points that should be included in a Commercial-Industrial Sales Training Program.

1. *Basic Information on the Utility Business*—This should include the history of the utility industry tracing its growth, technical progress, and pointing out the future service building prospects for the industry. Included also should be information on the economics of public utilities. The distinguishing characteristics of the utility business should be elaborated as this forms the basis for the answers to many of the questions concerning utility methods of operation. Other subjects to be covered are franchises, capitalization, accounting, regulation, valuation, depreciation, rates, taxation, etc.

2. *Basic Information About the Company*—This should include a history of the organization of the present company. The development of the company should be traced from the first small plants through the enlargement of these plants and the interconnection of various plants to form the present interconnected system. A discussion should be given on the present extent of the property, the sources of energy, the distribution facilities involved, and the employees required to render this service to the public. The nature and extent of the territory and the sources of wealth, population and the probable future growth should be made clear to

Survey of Sales Training for the Commercial and Industrial Salesman

(Replies from 10 Companies)

	Full Time	50% Time	New Men*
1. SALES PERSONNEL (Exclusive of Supervisors and Directors).			
A. How many men in **lighting** work as of Jan. 1, 1940	17	0	3
B. How many men in **heating** work as of Jan. 1, 1940?	3	5	0
C. How many men in **power** work as of Jan. 1, 1940?	10	10	0
D. How many men in **all service** work as of Jan. 1, 1940?	88	8	14
TOTAL	118	23	17

* Number of men trained during 1939

2. SALES TRAINING PROGRAM FOR NEW EMPLOYEES.

A. Length of Sales Training Period:

12 weeks	1	2 weeks	2
6 weeks	2	1 week	0
4 weeks	3	None	2

B. Time Spent with Experienced Salesmen:

12 weeks	1	2 weeks	2
6 weeks	1	1 week	1
4 weeks	3	None	2

C. Material Used for Sales Training of New Employees in Lighting:

1. G. E.—LaSalle Training course	7
2. Ill. Design and Other Data from Lamp Companies	10
3. Wiring Material Such as E. E. I. Wiring Handbook, National Electrical Code	9
4. Manufacturers Catalog Information	10
5. Schools Conducted by Representatives of Lamp Companies, Fixture Manufacturers, Etc.	—

Length of School:

2 weeks	—	1 day	1
4 days	4	Weekly meetings	1
2 days	1	None	2

6. Specially Prepared Material. List on Back of Page 4.

D. Material Used for Sales Training of New Employees in Heating:

1. Heavy Duty Cooking Equipment Manufacturers Material	10
2. Other Manufacturers Training Material	9
3. Northwest Commercial Cooking Conference	10
4. School Conducted by Representatives of Commercial Ckg. Equip.	6

Length of School:

2 days	3	1 day	3

5. Time Spent with Experienced Salesman	1
6. Specially Prepared Material. List on Separate Page or Back of This Page	4

E. Material for Sales Training of New Employees in Power.

1. Refrigeration Material	5
2. Motors and Their Uses, Control Devices, Etc., through Mfgs. Handbooks, Catalogs, Etc.	6
3. Wiring Material, Such as:	
E. E. I. Wiring Handbook	8
Manufacturers Handbook	8
4. Air Conditioning and Ventilation Training Material	3
5. Schools Conducted by Manufacturers' Representatives—	

Length of Schools:

1 week	1	2 days	—
4 days	—	1 day	4

6. Specially Prepared Material. List on Separate Sheet or Back of Page	4

3. CONTINUOUS SALES TRAINING OF PRESENT EMPLOYEES. PLEASE CHECK.

A. By Company Conferences:

3 per year	1	1 per year	3
2 per year	3	None	2

B. By Sending Men to Industry Conferences Such as:	
Northwest Cooking Conference	10
Other Conferences	8
C. Meeting with Manufacturers	8
D. By Direct Supervision and Sales Meetings with Supervisors	9
E. By Sending Out Pertinent Information. Handbooks, Articles, Etc.	9

4. NUMBER OF CUSTOMERS AND AMOUNT OF REVENUE—

Total Customers	125,993 (10 Companies)
Total Revenue	$37,652,173 (8 Companies)

the salesman. The relations of the company with the federal, state and local bodies should be studied and understood. It should be pointed out that the company is a part of the community growth and that its services are influential factors in the development of the community.

3. *Fundamentals of Salesmanship*—The salesman should be instructed upon the broad fundamentals involved in all selling and this training should cover such items as getting along with people, influencing human behavior, the reasons behind people buying any article or service. He should be taught how to make a proper sales presentation, how to handle objections and how to close a sale. He should be given a definite plan on how to keep customers sold on the value of electric service.

4. *Organization and Functions of a Utility Sales Department*—Every salesman should have presented to him a clear cut outline of his job. He should also be familiar with the duties of other employees in his department and in general of the employees of all other departments, as well as the duties and responsibilities of his immediate superiors.

5. *Selling Electric Services*—The salesman should be first instructed in how to sell electric services over other competitive types of electric service. He should be able to give the sales points of every type of electric service, such as the advantages of additional lighting, the advantages of electric cooking, the advantages of electric water heating, the advantages of electric deep fat frying, the advantages of electric food storage, and the advantages of electric power applications. His training should be such that he talks of the advantages resulting from the use of electric service rather than upon the advantages of the equipment. He should thoroughly familiarize himself with every industry, its problems, and how electric service can solve these problems.

6. *Continuous Training*—After receiving this basic training the employee has laid only the foundation and of vital importance is his continued effort on sales training. He must keep in touch with new developments and new uses of the electric service.

Now, let us see what this information would enable your commercial and industrial salesmen to do and to do efficiently.

First, it would enable him to sell the present use of electric service. This should be a comparatively simple task, as a customer is generally satisfied with his present use, or he wouldn't be using that amount. However, it may be necessary to make comparisons of operating costs with other items which he purchases in order to present definite commitments that his present service costs are satisfactory.

Second, it would enable him to sell against decreased use. This likewise should be an easy job, because a customer would have already decreased if it would have been feasible. Securing commitments that he could not afford to decrease his use is a valuable aid in retaining this load when business conditions become less favorable.

Third, it would enable him to sell the utility company. This is very important, because utilities are monopolistic in nature. The customers are apt to feel that they are forced to buy electric service from the local utility because other electric utilities are not operating in their vicinity. You and I do not buy our clothes from stores which we do not like. We go to other stores. Our customers, however, cannot go to other stores, and therefore it becomes our responsibility to sell these customers on our company.

Fourth, it would enable him to sell increased use if the customer is sold on his present use, sold against decreasing his use, and sold on the company. It is logical to point out that he should increase his use. This increased use comes on the low steps of the rate as his present use comes at an average higher figure, the salesman has a comparatively easy job to point out other services which can be economically used.

Let us see if this program would meet the sales training need of salesmen. Recently O. R. Doerr of the Pacific Gas and Electric Co. surveyed the training need of a large number of salesmen on the Pacific coast on "What Phase of Training Is Most Needed." The results were as follows:

	Per Cent
How to Make a Better Sales Approach	74
How to Close a Sale	72
How to Answer Objections	67
How to Meet Competition	62
How to Improve Personal Selling Qualities	59
How to Justify the Purchase	52
How to Classify Prospects	52
How to Find Prospects	51
How to Do Comparative Selling	51
How to Improve Demonstration	51
How to Apply the Selling Process	47
How to Make a Better Sales Presentation	46
How to Uncover Prospect Needs	41
How to Prove Selling Statements	40
How to Discover Product Selling Points	37

From this it is evident that an intensive sales training is needed in general selling principles. Your committee has checked over and presents briefly for your review the selling methods of the following three systems of selling as used by the various companies:

La Salle Extension University

5 Buying Motives
1. Comfort and convenience
2. Protection and safety
3. Gain and economy
4. Satisfaction of pride
5. Satisfaction of affection

5 Buying Decision
1. The need
2. The thing to fill need
3. The source
4. The price
5. The time

Advantage-Proof-Action on All Sales Points
1. State advantage
2. Prove it
3. Get action—ask for commitment on point

Theme: Check your fundamentals, to be sure that nothing was overlooked.

Borden & Busse

4 Step Formula for "Making a Sales Presentation Stay Presented"
1. Ho Hum!
2. Why Bring That Up?
3. For Instance!
4. So What?

(or)

1. Get interest!
2. Make application to case under discussion
3. Prove in logical order—serve it as a course dinner, not goulash!
4. Ask for action

Overcoming Objections—
"How to Overcome Sales Objections"
1. Don't talk too much
2. Don't interrupt
3. Avoid argumentative attitude
4. Inquire in first half
5. Restate objections
6. Establish, and stick to, key issue

Theme: Every salesman is a public speaker, with an audience of one or more.

Sales Analysis Institute

The Road to a Sale (sign posts)
1. Approach and introduction
2. Attention
3. Interest
4. Desire
5. Drive for close
6. Sale

Sales Movers (positive aspects)
1. Owner Benefit
2. Quality
3. Loss
4. Proposition
5. Prestige
6. Appeal to Pride
7. Assurance
8. Story
9. Service
10. Contact
11. Explanation
12. Atmosphere
13. Wedge Questions
14. Good Judgment

Sales Obstacles (negative aspects)
1. Habit
2. Fear
3. Price
4. Complaint
5. Detail
6. Ignorance
7. Competition
8. Friendly Competition
9. Difficult Personality
10. Time
11. Release
12. Divided Release
13. Negative Atmosphere
14. Poor Judgment

Warehouse of Sales Movers (appeals)
1. How (favorable attention)
2. What (owner benefit)
3. Why (benefit will be delivered)
4. Why Not (other services not equal to)
5. Who (is now enjoying benefits promised)

Suggested Method for Sales Analysis
1. Conditions—Favorable—Unfavorable
2. Problems
3. What
4. Why
5. Why Not
6. Who

Theme: Analytical, according to formula for conditions.

Your committee recommends that you check into the details of these methods, as the above is but an outline of the general procedure.

Rural Sales Bureau†

Electric Energy on Farms*

By W. R. NEWMYER,
Portland General Electric Co.

IN 1932 I selected a group of fifty farmers in the Willamette Valley division of the P.G.E. company for the purpose of tabulating their use of electricity from year to year.

This group was selected more or less at random from the meter books. Some of the customers had never been called on by the rural service department and were selected as "minimum bill" customers. Others were selected because they were low consumption customers but showed possibilities of being increased. This group had had very little help from the rural service department; the rest were farmers on whom we had worked extensively, had persuaded to add equipment, and expected to add more.

The largest increase in percentage (140) in 1939 over 1938 was made by a man who moved into a new home equipped with an electric range. On part of his farm he grows dahlias for which he installed an irrigation system. These two items account for his increase.

The next highest increase was 95 per cent, made by a gladiolus bulb grower. This was caused by the building of a new home in which was installed a range and water heater and also by the increased use of a 5 hp. irrigation system.

The largest decrease in percentage of consumption was made by a poultryman who used 50 per cent less electricity in 1939 than he did in 1938. Sickness caused him to quit the poultry business so he did not use brooders during the 1939 season. In all, the list shows 32 of the farmers increased their consumption in 1939 and 18 decreased. The group as a whole used 277,406 kw.-hr., an average of 5,548 kw.-hr. per year which was an increase in average of 710 kw.-hr. over 1938.

An interesting feature of this tabulation is that this group has used more electricity each year than they did the preceding year, so that in 1939 they used four times as many kw.-hr. as they did in 1931, an increase of 300 per cent

* *A report of Rural Sales Bureau.*

† John C. Scott, Puget Sound Power & Light Co., chairman; Ben W. Faber, Portland General Electric Co., vice-chairman; B. C. Electric Railway Co., S. J. Bowman; The California Oregon Power Co., C. R. Leever; Eastern Oregon Light & Power Co., R. L. Saling; Graybar Electric Co., S. G. Ward; Idaho Power Co., Earl A. Olson; The Montana Power Co., S. K. Patterson; Mountain States Power Co., C. B. Greenough; Northwestern Electric Co., Kenneth Hood; Oregon State College; F. Earl Price; Pacific Power & Light Co., C. O. Bunnell; Portland General Electric Co., L. C. Moore, W. R. Newmyer; Puget Sound Power & Light Co., C. W. Wildebour; Telluride Power Co., W. O. Cluff; Univ. of Idaho, Hobart Beresford; Utah Power & Light Co., K. W. Browning; Washington State College, W. A. Junnila.

based on 1931 consumption. The following tabulation on the direct right shows this year by year.

In order to get a picture of just what was happening on our rural lines, two typical 2,300-volt lines were selected and primary meters were installed in January, 1938, and were removed in July, 1939. One line in July, 1937, had 57 customers and by July, 1939, had increased to 86 customers. The customer average use of kw.-hr. was as follows. These figures show the tendency of the customers to increase gradually their use of electricity.

July, 1937	48.8
July, 1938	70
July, 1939	70
January, 1938	71.6
January, 1939	81

As the losses were approximately the same on both lines, the following figures from one of the lines are typical. Total customers connected varied from 75 in July, 1937, to 90 in July, 1939. Transformers in service averaged 44 with a total capacity of 145 kw. The maximum demand was 56 kw. and the average maximum demand on all transformers was 38.6 per cent.

Primary... 70,000 ft. of No. 4 ACSR
Secondary. 3,400 ft. of No. 4 BHD copper
Total length 73,400 ft. or 13.9 miles

While we of the industry knew that our losses in the rural areas were out of proportion to those in the urban areas, we did not realize that there was so much difference.

	1931	1932	1933	1934	1935	1936	1937	1938	1939
Total kw.-hr. used	63,744	81,284	96,378	114,584	159,110	166,571	206,929	241,908	277,406
Average per farm	1,386	1,659	1,928	2,292	3,182	3,331	4,138	4,838	5,548
Avg. increase per farm	...	273	269	364	890	149	807	700	710

	Kw.-hr. through master meter	Kw.-hr. through customers' meters	Loss in Kw.-hr.	Loss based on master meter readings	Loss based on sum of customers' readings
July, 1938	18,400	13,694	4,706	26%	34.4%
January, 1939	15,360	12,070	3,290	21.4%	27.26%
July, 1939	17,920	13,489	4,431	24.7%	34%

Farm Electrification in Northwest*

By C. O. BUNNELL,
Pacific Power & Light Co.

AS a basis for this report inquiries were sent to our member companies asking for an outline of their organization for promoting the use of electrical service in rural areas and to survey the general methods employed by them. Through reading excerpts from replies received, I shall give you first a survey of what is being done generally.

Utah Power & Light Co.
K. W. Browning

"Farm electrification work in our company is carried on by our regular residential sales organization under my supervision. All residential salesmen who have rural territory are expected to promote the use of farm service in connection with the regular residential sales work.

"We have had in five of our larger divisions, a special farm electrification salesman who headed up this work in the division and was responsible for training the other rural salesmen in farm electrification work with the assistance of this office. We have about 25 outside salesmen whose territory is largely rural and includes a good percentage of farm customers. Each man is required to submit on his monthly report, a list of the sales of additional farm services for which he is responsible or in which he has participated."

West Coast Power Co., Henry Berk

"Our system consists of a large number of very small widely scattered properties in which there are no large urban or densely populated rural areas. The nature of our operation and system and the class of customers we serve has not made it feasible for us to establish or promote a special farm service department. The work of recommending equipment and promoting sales is carried on by each and every employe and especially by the local manager through various local firms and agencies."

Eastern Oregon Light & Power Co.
LeRoy A. Grettum

"We have one man who devotes full time to this work, under my supervision. As far as possible, he handles all contacts with rural customers for every purpose except collections.

"He works up educational programs to be used in connection with 4-H Clubs, FFA and other organizations for farm boys and girls. He also works with adult farmers' organizations of all kinds. Another large part of his activities consists of assisting individual customers in the proper application of electric service to meet their special requirements. In this field he has done a lot of work in irrigation and poultry raising and is now working on a brooder box for lambs.

"He contacts prospective customers regarding extensions and explains our policy to them. He is equipped with a car and spends most of his time in the field."

Washington Gas & Electric Co.
E. J. Lundeman

"Our company at Longview is confined almost exclusively to the city of Longview and the territory immediately surrounding it. We extend to only a few farms. We do not have a special farm department, but the head of our merchandise department in Longview is an engineer and is capable of working out any problems that the rural customer may have.

"We have placed a few sterilizers and water heating equipment on farms; have promoted the use of soil heating cable, electrically operated brooders, etc."

Preston Shaffer Milling Co., M. L. Watts

"This is only a small community devoted entirely to the production of wheat and peas. The farms are large and the distance between houses is too great to make electrification of these farms profitable. So far we have not promoted any of this business but some of it nearby must necessarily be taken care of."

Montana Power Co., I. L. Comstock

"We have no farm sales personnel as such. We have regular residential salesmen who cover the small towns in the various districts, but they do not go out of the confines of the towns themselves.

"For the most part, our territory is sparsely populated. Our farms are known as ranches and are usually very large. We have a number of REA projects which have done much to electrify the rurals in our territory. We wholesale to these REA's."

The Washington Water Power Co.
R. B. McElroy

"We do not maintain a separate department for the promotion of service in rural areas. Since we serve mostly wheat territory, we have found that our regular salesmen could handle the scattered farm accounts in connection with their work in the various towns."

Grays Harbor Railway & Light Co.
H. G. Kelsey

"Our rural territory is more comparable with suburban territory in that our rural customers have built homes on small tracts of logged off land and are living outside the city limits. The men are working either on WPA or in the local mills and are cultivating a garden tract to produce vegetables for thier own consumption. Their use of energy is limited entirely to lighting the home and operating domestic appliances, including a water pump. One of our employes reads these rural meters and handles the rural collections. This man is interested in farming and keeps in close touch with the County Agricultural Agent. In this manner, he is able to offer advice to the very few customers who have sufficient land under cultivation to be classed as farmers and who are in a position to use electricity for farm purposes."

Others among our member companies maintain elaborate farm promotional programs as a special department of their sales organizations. Each of these serves an extensive, densely settled agricultural area. All utilities must work on a sound economic basis and this matter of economics is and must remain the yardstick governing developments of rural electrification so far as the private companies are concerned. The rural population in certain sections of this Northwest is increasing at an astounding rate. Large ranches in the vicinity of many towns are being subdivided into small farms and many eyes are turned toward these other companies, in study of the methods being used to cope with this growth. Here is an outline of their methods and practices in building farm load.

Northwestern Electric Co., K. S. Hood

"The Northwestern Electric Co.'s rural area is in southwestern Washington and in

* *A report of Rural Sales Bureau.*

Columbia County, Ore. Exclusive of the cities and incorporated towns, there are about 5000 rural customers served.

"The sales department personnel consists of seven salesmen and three home economists. Five of the men have the combined duties of rural and residential selling. The other two are assigned to the Vancouver and Camas residential districts. The territory is divided into three sections for the home economists, whose duties also include home lighting activities. An average of 1,500 customers per man is the present arrangement. Responsibilities include a complete coverage on all domestic and farm appliances.

"In developing and adding to the personnel, certain qualifications are used as a guide. A background of a college education in agricultural engineering is a sought-for requirement. Consideration is also given to an employe of another department of the company if he has ability for sales work and if his qualifications and previous experience convince us that he can make the grade.

"Systematic coverage of customers is attained in contacting by meter book account numbers. Each meter book has about 75 customers listed. A customer's name, address and account number are typed on what is called a survey card. Survey contacting is carried on in conjunction with calls on new connects, call backs and prospects, sales follow-ups, special campaigns and miscellaneous contacts. After a meter book list has been called on, the cards are filed at the office where cut-ins and cut-outs are checked to keep the customer list active and up to date.

"Quotas are set up on a monthly basis for each man. Cash prizes are offered for percentage points over the individual quota. Quarterly, semi-annual and annual cash prizes are also awarded on a competitive basis.

"The Northwestern Electric does not merchandise, therefore all prospects developed are allotted in rotation to dealers who have salesmen in the field. The company representatives determine as to when the customer has been sufficiently developed to warrant a dealer call. Quality and not quantity of prospects is stressed in dealer leads.

"Demonstration equipment will be an important part of our program this year, it being a part of the salesman's job to see that appliances are kept working in the field. Demonstration equipment consists of 7 electric ranges, 1 5 hp. motor, 1 Hammer Mill, two soil heating units, two homemade forced ventilation brooders, one ½ hp. 500 gal. per hr. shallow well pump, two bug electrocutors, one poultry water warmer and six 1000-watt low pressure water heaters. A single-wheel trailer is available and is adapted to hook on to the salesman's car when he takes out or transfers a piece of equipment.

"Special emphasis is placed on certain seasonal items. Demonstrations are given with the cooperation of the large dealers from nearby Portland. Tours are organized throughout the territory.

"Constant study on farm appliances, not only from practical experiences, but from the scores of sources such as agricultural engineering books, college experimental data, farm journals and from meetings with farm appliance dealers enable us to keep abreast of the market.

"Opportunities to work with county agents, grange organizations, 4-H Club members, Smith Hughes instructors and other groups are sought after with the belief that in doing so, we are taking our place in the community and expressing our good will.

"Campaign broadsides, seasonal letters, special bulletins and bill stuffers are part of the rural campaign in advertising. We also publish an eight-page monthly newspaper which is assembled from material of local interest and sent to all our rural customers. Sales meetings are held weekly. In these, a lengthy general discussion period is allowed to review and clear up problems met in the field."

Puget Sound Power & Light

Puget Sound Power & Light Co. is another company doing an outstanding job with a farm electrification program. I quote from a paper entitled, "A Balanced Program of Farm Electrification Activities," by J. C. Scott, covering their operations which could well be used as a guide by any organization.

"It is obvious that any program of farm electrification begins with the construction of rural lines. However, the responsibility of the power company does not end with the construction of lines and delivering current to rural customers. In fact, a real farm electrification job has only begun; that is, in assisting farmers to reduce labor and expense of production, and at the same time improve the quality of their products; to make the line pay, so that more lines can be extended and more farms electrified.

"Experience has demonstrated that farmers will not use electricity to an extent where it will be most profitable to them unless they receive dependable service. Continuity of service, along with maintenance of satisfactory voltage regulations, is of particular importance to farmers as well as others. Also, farmers must have technical assistance in applying electricity to their farm jobs."

Puget Sound serves 31,052 farms with an average annual consumption per farm of 1555 kw.-hr. They maintain a farm equipment laboratory with two full-time specialists, who in cooperation with the state colleges, extension services and other organizations, seek out, develop and test new devices for the application of electricity to farm problems. They employ one full-time supervisor and eight field men, maintain an extensive exhibit at the State Fair, participate in local fairs, carry on radio programs of farm news and topics as well as a daily broadcast of market reports. They also maintain a constant campaign of advertising, specializing in local and farm papers.

Portland General Electric

Portland General Electric Co. has also had a rural electrification program for several years, and developed a program which they feel meets the needs of their territory. I quote excerpts from the report by L. C. Moore:

"At the present time we have a total of 11 men devoting their efforts to rural service and line extension work. Some of the rural service men devote a majority of their time to line extension activity; others do practically no line extension work.

"It has been our experience that the best preparation for our type of rural electrification work is that which has a good practical farm background supplemented with agricultural training, or if possible, agricultural engineering training. It is difficult as yet to secure men having the additional combination of background and training, and we have found that for our work, the agricultural background and agricultural training, plus the ability to understand and get along with farmers, is of more importance than technical engineering training.

"Our company now does no direct selling of merchandise of any kind, consequently, each rural service man has the responsibility of working with established dealers in our territory as well as helping to establish additional dealers where they are needed. At times, this method seems discouragingly slow in load building results, but in view of the development throughout our territory in the matter of building up better dealers, we are confident that in the long run the total sales to farmers in our territory will be greater than if we attempted to do the merchandising ourselves.

"Lighting service to the farm with only four to seven farms per mile of line is costly service. It is costly from the standpoint of the original investment per customer. The interest, depreciation, overhead, maintenance, service, line and transformer losses per customer are all excessive, when compared with service in the city. The readiness-to-serve cost is out of all proportion to the monthly income. If electric service in the country is to be permanently successful, it must not be a burden to server and served, but must be a source of profit to both. The first consideration then, is to find ways in which the farmer can use electricity at a profit in his business.

"At the present time, we list 14,249 farm customers served.

"We are convinced that in the light of our experience, as well as by the advice of experts, any rural development program to to be successful, must be based on the fundamental of making the use of electric service profitable to our farm customers, and must include the constant aim to help build a better managed and more profitable agriculture in our territory.

"Our own experience, as well as the experience of a number of utilities operating extensive rural development programs, points clearly to the need of a systematic survey and card record of the individual farms in the territory served.

"Our general farm picture serves as an entree to group meetings and when backed up with well organized educational pictures, slides and charts, establishes our program as an acceptable source of farm electrification information to farmers.

"The most important part of our educational activity involves working with 4-H Clubs, The Future Farmers of America, Smith-Hughes High School agricultural instructors and students and other young people's groups interested in farm electrification projects.

"Qualifications for rural service men are: personality, faith in the program, training, and an agricultural background that permits an accurate and rapid analysis of present farm operating conditions, as well as possible readjustments through electrical operation."

Pacific Power & Light Co.

From its beginning in 1910, the management of Pacific Power & Light Co. has been aware of its responsibility toward the development of the rural territory on which the welfare and prosperity of its urban centers are dependent. Under a constantly liberalized rural extension policy, its farm load gradually developed until in the early 1920's, it took such a jump that by

1929 about 6,500 farm customers were being served and it was realized that there was a necessity for a definite farm electrification department. By 1932, this department had developed to where there were eight full-time and five part-time field men employed, with 8,019 farm customers being served. Contrary to expectations, the increase in farm customers did not abate during the depression. Instead, it rapidly increased until in April 1937, the 10,000th farm was connected for service. At the present time, we are delivering electric service to 11,509 farm customers.

Farm Classification

On our properties, a farm is classified as any tract of land of three or more acres used mainly to produce agricultural products, or any place of three acres or less, where the owner or tenant devotes his entire time thereon to agriculture. Poultry and game raising, floriculture and horiculture and similar pursuits fall within this classification. Whenever the above definition unduly restricts farm service, by reason of the extent of acreage, or any other good reason, the definition may be interpreted so as to include additional customers who properly should be classified as farm customers. There is in addition, a sizable group of marginal customers residing in and about small villages and on the outskirts of larger towns who cannot well be classified as farmers, but who carry on a considerable amount of farming activity and who represent a considerable potential market for farm electrical equipment. Those of our customers classified as farmers, use an average of 2,128 kw.-hr. per year for all services. If we subtract from this the seasonal loads such as irrigation and spray, we have an average for the farm home of 1,409 kw.-hr., which is still evidence that our rural men have done an excellent job.

Our experience has shown us, however, that one man in a territory such as ours, which is spread from Seaside, Oregon, to Pomeroy, Wash., can call on and properly serve but from 500 to 750 farm customers annually. We feel that to maintain good customer relations, every farm customer should be called upon by the rural service agent at least once during each calendar year. To accomplish this, we plan ultimately to have twenty-two full-time and four part-time men in the field, each located as near as circumstances will permit in the geographical center of his own territory. Of course this will mean fewer than the suggested 500 to 750 farm customers per man, but this shortage will be more than made up by the addition of marginal farm customers now rated as residential, who will be added to the list of each agent.

At the inception of our farm service program, the field personnel was selected from among our regular employes. At present, we are still selecting from among our own employes such men as meet the general requirements, but where it is found necessary to go outside our own organization, we are attempting to procure men with college training in agricultural engineering. We go beyond this, however, and try also to pick those who have some knowledge of electrical engineering, utility background and actual farm experience. In addition to this, we insist that they be married, that they possess a pleasing personality and a desire to learn. We are not so concerned with their desire to sell in the common idea of that term, but want them to be able to sell themselves and our company at all times.

Training Procedure

With all this in mind, each new man is at first placed directly under the supervision of the district manager in whose district he is to be employed, or under the direction of an experienced rural service agent selected by the district manager, where he is given several weeks of intensive training before being assigned to a definite territory. This training consists of a general study of the history of our company, its growth, its physical and financial structure, its general policies, rural line extension procedure, rate structures and its attitudes and aims. By the end of the first week, the new employee is sent out on a few farm calls in company with a regular rural service agent. These calls are gradually increased until toward the end of the training period he is permitted to make calls by himself and report back as to his methods of handling situations which arise. Each report is carefully checked and advice given on any points where doubt has been shown, or errors have crept in. The new man is then assigned a territory and if he has not already been over the ground, he is taken over it, introduced to some of the more outstanding customers and proceeds to locate a place of residence, with their assistance, if possible. His duties from here on are to make himself an integral part of the community, to call upon each of his assigned customers at least once during each calendar year, to aid and advise them in the use of electrical equipment and the most economical application of it to the farm needs, to guide them in the selection of such equipment as will bring them economy, profit and satisfaction, to help them solve their problems of installation and operation and last, but not least, to sell himself and his company to them in such a way that he will be the company in his immediate territory, so that whenever they think of electrical equipment, they will immediately think of and call upon him for advice. We hope that through this approach we will be able to personalize our rural service to the end that we will prove our honesty of purpose and sincere desire to maintain dependable service at reasonable cost, thereby, through increased confidence, increasing the sale of electrical equipment and adding to our revenue.

Rural Agent Reports

When definitely established, the rural service agent will report regularly to the district sales supervisor, who will direct his activity. They are each furnished with an annual program outline, a date book, a call record book with each customer listed in meter book order, a farm equipment catalog with price lists covering the few items handled directly by our company. They are supplied constantly with literature covering most types and classes of other equipment and services available or useful, and are kept up to date on literature emanating from the state colleges and other reliable sources. They report once each week to the district office to discuss current problems. At least twice each month they are called in to take part in classes on sales training and at irregular intervals, the general office farm service supervisor holds evening meetings with them, the district manager and district sales supervisor, for direct discussion of general problems in order that new ideas may be presented and that he may be able to coordinate the activities of all districts. Once each year, all are assembled at the general sales meeting of the company, where they obtain a broad picture of our total operation.

As a further aid, we mail a monthly news letter to a selected list of customers, wherein current happenings, sound practices and new and novel ideas in farm electrification are discussed. All new farm customers are given a one year subscription to the magazine, *Electricity on the Farm*. Each rural service agent is furnished a subscription to *Rural Electrification Exchange* and is furnished with a weekly clipping service and current event review to keep him posted on current events in the industry.

For the present at least, we have not set up any quotas for direct sales by these men, but they are expected to promote sales and even take orders for equipment where it appears that this can be done as a personal favor to the customer. In general, it is expected that prospects will be turned over to our regular salesmen and to dealers. It is believed this type of program will build confidence on the part of the customers that will result in sales.

But their first task is to make them-

selves a useful cog in the life of the community: to assist the farmer to make economical use of the equipment he now has and to guide him in the selection of such equipment as will fit his needs; to aid in any enterprise that may be of value to the community and to exemplify and sell his company and his service to the end that better and more personal service may be rendered, thereby inducing greater and more widespread use of electrical equipment. It is in this way that we hope we may be able to continue economically the past record of rate reductions, thus demonstrating the virtue of keeping this business of ours in the hands of well trained, honest and dependable servants.

Electric Laboratory In a Public Utility

BY C. W. WILDEBOUR
Puget Sound Power & Light Co.

EXPERIENCE has proved the value of a laboratory in carrying on a well-rounded farm electrification program. The first function of such an establishment should be to assist field men when unusual technical problems arise; second, the development of original new uses for electricity plus the improvement of equipment already on the market; third, close study and if necessary actual testing of newly offered farm equipment. This practice has in many cases prevented future embarrassment to field men and the utility in general when improper equipment might otherwise have been recommended. When such newly offered equipment does have real merit, laboratory endorsement adds to the enthusiasm of field men in placing such equipment.

Manufacturers Assisted

Manufacturers are often materially benefited by assistance and suggestions from the laboratory in the correction of faults in their products. Since such manufacturers are often small concerns served by the utility, the benefits to the utility are two-fold—the apparatus is made useful to the farmer while the manufacturer is placed in a position to profit from its promotion.

Fourth, the laboratory thoroughly investigates new developments by farmers. If considered worthy, such apparatus is properly drawn and described and the information made available to other prospective users. In all such cases the farmer is given full credit even though the laboratory has deemed it necessary to revise his plans materially.

Fifth, when a utility exhibits at large annual fairs, the laboratory can play a definite part in making such an exhibit an outstanding success. To attract people at a fair, an exhibit must be new, spectacular and tell the story quickly. This requires very special animated displays that can seldom, if ever, be purchased to suit the occasion. A properly equipped and manned laboratory can and does build them.

Value of Laboratory

As to dollars and cents value of a laboratory. During the year 1939, the farm electrification department of the Puget Sound Power & Light Co. placed load building equipment on the lines, outside of the home, having an annual revenue of $52,063. The retail value of this equipment amounted to $274,306—add to this 20 per cent for wiring and you have a total of $300,000 in dealers' sales. These figures cover only the placement of equipment in which our field men assisted and is therefore not a mere dealers' sales report. Now what part did the laboratory play in the addition of this $52,000 in annual revenue? The following is a partial list of devices added to our lines during 1939 for which laboratory developments are largely responsible:

- 619 brooders
- 442 dairy water heaters
- 19 greenhouse heating installations
- 19 greenhouse lighting installations
- 82 motors totaling 204 hp.
- 36 soil heating units (we already had a high saturation prior to 1939 which accounts for the small number)
- 7 soil sterilizers, one of which, installed on Vashon Island uses current to the extent of $900 a year. They have a set-up whereby sterilization on that basis will be carried on continually year after year
- 206 ventilating fans for greenhouses
- 497 poultry trough water warmers
- 8 poultry house heating installations
- 7 poultry house ventilating installations

Of the items just mentioned there are two that might be questioned as to our laboratory participation, brooders and dairy water heaters. As to brooders, I can safely say, up until the time we developed the force-ventilated brooders, we were rapidly losing brooders from our lines. It was necessary to develop a brooder suitable for our particular climate. As to water heaters, we did not build the water heater that is so popular today, but we did help in determining the size and other specifications and most of all arranged for sealing the thermostat so the dairyman cannot change the setting without breaking the dairy inspector's seal. That was the final insignificant but important item that secured the support of the dairy inspectors who in turn are largely responsible for the placing of 442 of these water heaters during 1939.

During 1939 we developed the following new devices: a cultivator driven by a ¼-hp. motor with an entirely new system of blading; an egg humidor that produced excellent results in comparison with others, according to tests conducted by the Western Washington Experiment Station; a wiring demonstration kit for the use of field men. This kit vividly illustrates the necessity for adequate wiring and is used before groups of farmers. We plan to expand this kit to provide entertainment in the form of electrical stunts. An electric clothes dryer was also developed. A few news releases on this item produced a flood of inquiries beyond all expectations. Drawings which we furnish enable any handy man to construct the dryer, and a manufacturer is at present completing arrangements to market it.

Poultry Waxer and Reclaimer

During the year we also produced a poultry waxer and reclaimer. Construction is such that a water jacket is not required for proper temperature distribution. Distribution of temperature is secured through the medium of a small fan which circulates hot air in the space that ordinarily is occupied by hot water. By this arrangement, construction costs are materially lower than water-jacketed equipment and the same device may be used for reclaiming as well as waxing. This is not possible with a water-jacketed device for the reason that reclaiming the wax requires temperatures much above the boiling point of water. We believe the same principle (hot air circulation) could be successfully applied to restaurant steam tables.

Sometimes we are hi-jacked into developing things that are really not in our usual line of endeavor. During 1939 we constructed a window display which demonstrates three lighting features; namely, (1) reflection factors of various colors; (2) comparison of direct with indirect lighting by the alternate showing of shadow and no shadow effects; and (3) a reading test with and without glare. The display is built in three units which operate in sequence requiring two minutes to complete the cycle. The display is now being moved from store to store throughout our system.

Our latest development is an electrical poultry floor scraper. This is a very simple, compact solenoid-operated device that eliminates at least 80 per cent of the labor ordinarily encountered in performing that laborious task. We wil release this development in a few days.

Our next activity will be along the line of electric field cultivating from start to finish including plowing.

A brief description of the laboratory in which this work is being carried on may be of interest. We occupy a floor space of only 15 ft. x 35 ft. plus a 15 x 15-ft. office. Our major equipment consists of a 9-in. quick-change gear screw cutting lathe, drill press, 12-in. band saw, 8-in. saw table and a 4-in. jointer. Our instrument shelves are well filled with voltmeters, ammeters, current transformers, watt meters, ohmmeter, curve drawing thermometers and a good hydro-thermograph. One of our most valued and useful instruments is a 10-point Leeds & Northrup resistance thermometer.

The location of a laboratory should also be considered. Ours was placed at Puyallup where the Western Washington Experiment Station is also located. We thus have immediately available the knowledge of highly specialized men in almost every field of agricultural work. Not only do we benefit from consultation with these specialists but cooperative projects with this station are nearly always going on. In the past we have worked in cooperation with the station on indoor and outdoor soil heating, greenhouse heating and ventilating, blueberry propagation, poultry brooding, ultra-violet versus cod liver oil experiments, litter drying and the effects of water warming for poultry. At present cooperative projects on soil sterilization and hay drying are under way.

There are, of course, exceptions to any rule, but we do believe that generally speaking the man trained in agriculture is better qualified and more effective on farm electrification work than the electrical man. A man without special training in either field may possess a personality that outweighs the value of either kind of training. We believe that with the support of a laboratory to which problems may be submitted, the agriculturist or the untrained man can be used to excellent advantage. With the ever-present problem of shifting personnel in a large organization, this point is well worth considering.

New developments have little or no value unless properly brought to the attention of prospective buyers. It is a further fact that a man interested in the actual creation and development of new things is seldom, if ever, interested in their promotion. In fact, when a problem is once settled he prefers to busy himself with another problem rather than promote the development already completed, so a laboratory without a promotional department would be of little value.

Here are a few simple things which in my opinion are essential in the operation of a laboratory such as ours:

1. Complete relief from duties except those pertaining to development work.

2. Authority to purchase supplies, tools and materials without having to secure approval for each purchase of everyone from the office boy to the president. This can be handled by writing blanket requisitions at the beginning of each year on all firms from whom purchases are frequently made. Requirements from firms not covered by blanket requisition can be requisitioned in the usual manner without delay as they can be anticipated in advance. A petty cash account for small purchases should also be provided.

3. Last but not least, an appreciative boss. I might add that we are blessed with all of the points just mentioned.

The personnel of the laboratory just described consists of Glen Cushing and myself.

Advertising Committee†

Best Advertising Campaigns in 1939*

By JOHN DIERDORFF
Northwestern Electric Co.

THE Idaho Power Co. has found a way to give its advertising and sales executives more free time to plan sales and advertising campaigns for the following year, said Gilbert L. Stanton, advertising manager of that company. The fall campaign is laid out to cover a 16-week period. Advertising copy and sales programs are prepared at the beginning of the fall campaign, which leaves executives more time in November and December to map out strategy for the following year. The Idaho company stresses all services during its fall campaign, capitalizing upon the momentum generated by the specialized campaigns in the first nine months of the year. Our sales organization has found that the momentum achieved during the spring and summer months can be used to advantage by extensive promotion of all electric services from Sept. 1 to Christmas.

A surprisingly large number of ranges and water heaters has been sold by the Idaho company in these fall campaigns. Range sales during the last 16 weeks of 1939 totalled 1,057 units by the company and the dealers. This volume was achieved in the face of a saturation of approximately 53 percent, and buying continued at a rapid pace right up to Christmas day. Four hundred fifty-one water heaters were sold during this same period.

DIERDORFF

The largest volume in small appliance sales in the history of the company was sold by dealers during the 1939 pre-Christmas season. To promote this business the Idaho Electrical Equipment Sales Assn. ran a series of full page ads in two colors in the Boise papers. These ads appeared on Sunday. Dealers then ran their own specific appliance advertising during the week independently of the Association's Sunday pages.

Puget Sound Power & Light Co.

Institutional advertising has been a major phase of Puget Sound Power & Light Co.'s campaigns during the past year, said J. Harvey Leach, advertising director of that company. Continuing, he said, to put personality into the company's institutional advertisements is something for which we continually strive.

Many different subjects have to be covered in a successful series in order to cover the wide range of individual interests among customers. Among points of interest which Puget Power has presented in its ads are the following: rates, taxes, employment, company purchases, company services to customers, personnel of the company, the company as a good citizen, and the basic idea that the company is cooperating in every way possible in the development of the region it serves.

It is also possible to capitalize on the fact that the company has pioneered electrical service. This point prompted the comment from Ralph E. Gale, general sales manager of the Idaho Power

*Abstract of Bureau Conference using "radio news flash" method of presentation.

† Advertising Committee: John Dierdorff, Northwestern Electric Co., chairman; J. Harvey Leach, Puget Sound Power & Light Co., vice-chairman; The Birchard Co., P. T. Birchard; B. C. Electric Railway Co., J. Lightbody; The California Oregon Power Co., Herb Grey; Eastern Oregon Light & Power Co., Leon Gray; Jos. B. Gerber Co., Chas. H. Devlin; Gillham Advertising Agency, Lon Richardson; Idaho Power Co., Gilbert L. Stanton; McCann-Erickson Co., Vernon Churchill; The Montana Power Co., W. P. Dolan; Mountain States Power Co., H. E. Farris, C. L. McKinley; Pacific Power & Light Co., M. G. Kennedy; Portland General Electric Co., Ralph Millsap; Strang & Prosser, Grant Merrill; Utah Power & Light Co., M. L. Cummings; The Washington Water Power Co., K. I. Jack.

Co., that a power company's investment in facilities can be made more understandable by comparing an electric system to a highway system. Further, if you take the historical cost of developing your state highways and divide this cost by the mileage, you will find that the cost of developing these highways to their present state has been at least double the amount it would cost to build them new today. Our highway system developed from trails to wagon roads, from wagon roads to the first gravelled highways, and from the original gravelled highway to the straight smooth two, three and four lane thoroughfares we have today. It was the same with the development of our electric systems.

Pacific Power & Light Co.

After experimenting with various methods of telling the company's story in print, Pacific Power & Light Co. has come to the conclusion that the job cannot be done successfully by appending the institutional story to service selling copy. So said M. G. Kennedy, sales promotion supervisor of the Pacific company. This year the Pacific company has started a series of leaflets, each of which tells about some one phase of the company's business or operations. These leaflets are being distributed to all customers with their service bills. The same copy is being used in a series of newspaper ads which are being placed in all papers in the company territory.

"Salesmen have been supplied with other leaflets which give thumbnail sketches about the company and which are used with every call on a prospect.

"The company's annual report has been dressed up with pictures and charts, and copies of this report are distributed to a selected list of customers as well as to all stockholders and employees."

Tell your story simply and tell it often is the underlying theme of the Pacific company's institutional program.

B.C. Electric Railway Co.

"How do you get into a war?" was the question asked when J. Lightbody, publicity manager, stated that since Canada entered the Second World War the B. C. Electric Railway Co has had no institutional advertising problem.

"People have stopped talking about municipal ownership and various kinds of schemes to put the government in the power business.

"Of course, we have to keep right on selling our services consistently in order to get and hold business, but for the moment we have none of the problems that are so acute with you on this side of the line. An 8 percent Federal sales tax on sales of electricity and gas has been imposed by the Canadian government, but this tax is required to be passed on to the customer."

The B. C. Electric has found humorous illustrations and phrases very effective in putting over its advertising campaigns. The backbone of the company's water heating campaign has been billboards. "Phooey, no hot water," illustrated by an amusing sketch is characteristic of the company's posters.

The necessity for long continued repetition of an idea was illustrated by Lightbody with the statement that after four or five years of advertising water heaters for rent at 50c a month they still find many persons surprised to learn that this rental service is available.

Recommended as good mental discipline by Lightbody was the idea of trying to tell an institutional story successfully in the few words of copy that can be used on a billboard.

Portland General Electric Co.

Ralph Millsap, advertising manager, Portland General Electric Co., told about a "nudist contest" sponsored by that company to stimulate sales of ranges and water heaters. The dealer salesmen were started off with a G-string and each sale won another article of clothing, ranging from socks, underwear and shirts to a $75 suit of clothes. The campaign proved so successful leading salesmen wound up with at least two complete outfits.

Portland General Electric is well pleased with a plan giving dealers an advertising allowance of $5 each range or water heater sold. This sum must be matched by the dealer. The cost to the company has averaged only $1.10 per unit sold since many dealers do not use up their full advertising allowance. "In one community the dealers and the newspapers are doing such a wonderful job we don't know where it will stop," said Millsap.

"The more units the dealers sell, the greater is their advertising allowance. The more they advertise, the more they sell—and the more they sell, the more they get to advertise with."

The Washington Water Power Co.

Electric cooking was successfully promoted by The Washington Water Power Co. through a contest built around an electric cooking quiz, according to Harvey A. Brassard of Syverson-Kelly advertising agency. Contestants called at dealers' stores to get entry blanks and after filling out answers to a series of questions, some sane and some insane, they were required to describe their particular kitchen peeve in 25 words.

The major prizes were nine electric ranges, one to be given away each week of the contest. An average of about 1,000 entries was received each week and the campaign was regarded as having contributed substantially to the success of the company's range promotion.

The company also began a series of institutional ads and will continue to tell the company's story in this way.

Northwestern Electric Co.

Northwestern Electric Co.'s most successful campaign in the past five years, according to John Dierdorff, advertising supervisor, was carried on throughout most of 1939. It was built around the idea that electric service is very cheap in relation to other items commonly used in the daily lives of customers. For example, a sketch would illustrate a pipeful of tobacco. The copy would say, "A pipeful of tobacco costs only half a cent—but that is more than enough to toast umpteen slices of bread at Northwestern Electric's very low rates."

Each ad also carried a standard piece of copy which stated in display type that Northwestern rates were 41 percent below the national average. That the campaign was successful was indicated by the fact that many customers of the Portland General Electric Co., operating in the same territory, often had to be talked out of the idea that they were paying a higher rate than was charged by Northwestern. Also indicative was the fact that the campaign was scoffed at by some of the better known public ownership promoters.

Utah Power & Light Co.

M. L. Cummings, manager, advertising and sales promotion, reported the Utah company's "Up-We-Go Campaign" in the spring was regarded as the most successful during the year. The name was derived from the slogan "An Upward Line in '39." The campaign was on ranges, water heaters and IES lamp.

Much stress was laid on promoting the campaign within the company's own organization. Monthly cash prizes and commissions were offered to the regular sales personnel, and prospect commissions were paid employees outside the sales department.

Electric cooking, featuring a combination offer of a $25 set of aluminum with the purchase of an electric range, received the major share of advertising. The aluminum deal was sponsored by the Electrical League of Utah, with the dealers effectively tied in by listing ranges included in the offer. Media included, beside newspaper advertising, outdoor posters, radio, a half hour program and spot anonuncements; direct mail, store and window display cards, as well as bus and street car cards.

During the three-month campaign 1,194 ranges, 493 water heaters and 662 IES lamps were sold.

Engineering and Operation Section*

Introductory Statement

THE 17th annual general meeting of the Engineering & Operation Section met in the Davenport Hotel, Spokane, Wash., April 10-12, 1940, with Paul P. Ashworth, chairman. Total registration was 178, of which there were 55 from Spokane and 123 from outside that city. In addition there were 14 visiting ladies.

E. H. Collins, Washington Water Power Co., acted as chairman of the committee on arrangements, consisting of men from his own company and local representatives of manufacturers and jobbers. This committee arranged several trips of interest to delegates in and around Spokane, culminating in a trip to Grand Coulee dam on Saturday. April 13. Provision was also made for the entertainment of the visiting ladies.

The annual banquet was held Friday, April 12, with J. E. E. Royer, vice-president and general manager of Washington Water Power Co. and president of the Association, acting as toastmaster. Entertainment at this affair was provided largely by men from WWP. At the close of the banquet the company's moving picture, illustrating the nature and extent of electric service rendered by the company in central Washington, was shown.

The three days of technical sessions were divided among the six committees of the Section, with approximately a half day given over to each committee. The greater portion of the papers and discussions coming out in these sessions are printed in the following pages, with, however, certain condensing due to space limitations. A few of the papers appear elsewhere than in this issue as follows:

In the May issue of ELECTRICAL WEST there appeared on p. 48 a paper by Glen L. Lane, Washington Water Power Co., "What EEI is Studying in Apparatus and Design." This paper was presented at the Thursday p.m. session under the program of the apparatus and design subcommittee of the Electrical Equipment Committee.

Also in the May issue, p. 50, is the discussion by J. F. Spease, General Electric Co., entitled "Controlling Power Flow," which was presented also at the Thursday afternoon session under the systems engineering Subcommittee of the Electrical Equipment Committee.

The following papers with brief discussions thereon will be held over for publication either in July or August, ELECTRICAL WEST: "Adequate Wiring," by H. C. Bender, The Washington Water Power Co., presented Wednesday afternoon as part of the program of the utilization devices subcommittee of the Utilization Committee; "Application of Portable Substations for Inspection and Maintenance of Equipment and Emergency Service," by D. C. Keller, Puget Sound Power & Light Co., a paper of the apparatus and design subcommittee of the Electrical Equipment Committee; "Re-enforcing Older Rural Lines," by J. F. Emery, Idaho Power Co., presented Friday afternoon as part of the program of the Transmission and Distribution Committee; "Recent Developments and Improved Practices in City Distribution," by D. A. Hord, Northwestern Electric Co., also presented under the auspices of the Transmission and Distribution Committee.

Other features of the meeting not to be published for one reason or another are referred to in the following summary of the meeting.

The meeting opened Wednesday, April 10, with a welcome from H. W. English, city commissioner of Spokane representing F. G. Sutherlin, mayor. The response by J. E. E. Royer is published hereinafter.

D. W. Prairie, Northwestern Electric Co., chairman of the Accident Prevention Committee, then took over and presented the program of his committee. This committee also held a special meeting Wednesday evening, and other committees met either at lunch or dinner on other days.

Wednesday afternoon was given over to the Utilization Committee under John Bankus, Portland General Electric Co., chairman. L. V. Ross, of Washington Water Power Co., presided for the illumination subcommittee in the absence of F. H. Murphy, Portland General Electric Co., chairman. A feature of this subcommittee program was an explanation of the new street and highway lighting "Evaluator," developed by General Electric Co., by Walter E. Potter of the Lamp Department of that company. This device was displayed at the meeting and was demonstrated in actual practice each night during the convention. The device is mounted on an automobile which is then driven along the street on which the lighting is to be evaluated. The observer then notes and records, by reading the "Evaluator," the three principal factors in a street lighting system which combine to produce visibility: (1) pavement brightness, (2) obstacle brightness, (3) glare from street lamps or other sources. Knowing these factors, the lighting salesman possesses an effective tool for his street lighting sales work. Potter explained that the "Evaluator" would be available either for sale or rent.

The other half of the Utilization Committee program, namely that of the utilization devices subcommittee, was presided over by J. E. Yates, Pacific Power & Light Co., chairman.

The Power Production Committee under E. H. Collins, The Washington Water Power Co., chairman, presented its program Thursday morning.

On Thursday afternoon the program of the Electrical Equipment Committee under J. Hellenthal, Puget Sound Power & Light Co., chairman, was divided four ways between meters and services subcommittee, A. H. Kreul, Portland General Electric Co., chairman; systems engineering subcommittee, O. L. LeFever, Northwestern Electric Co., chairman; apparatus and design subcommittee, C. E. Cannon, Washington Water Power Co., chairman; and operation and maintenance subcommittee, C. D. Raney, Washington Water Power Co., chairman.

As a supplement to the paper by J. F. Spease "Controlling Power Flow," C. T. Hurd, Allis Chalmers Mfg. Co., offered a discussion of some actual installations illustrated by diagrams and photographs. One of the important interconnections shown was that between the Boston Edison Co. and the New England power system.

At the end of the Thursday afternoon session, the Phelps-Dodge film, "Cop-

*Paul P. Ashworth, Telluride Power Co., chairman; Magnus T. Crawford, Puget Sound Power & Light Co., vice-chairman; B. C. Electric Railway Co., A. Vilstrup; The California Oregon Power Co., J. C. Boyle; Eastern Oregon Light & Power Co., O. D. Lanning; Idaho Power Co., H. M. Jones; Northwestern Electric Co., O. L. LeFever, D. W. Prairie; Pacific Power & Light Co., R. J. Davidson, H. W. Schoolfield; Portland General Electric Co., John Bankus, O. B. Coldwell, C. P. Osborne; Puget Sound Power & Light Co., J. Hellenthal, George E. Quinan; Utah Power & Light Co., L. B. Fuller; The Washington Water Power Co., E. H. Collins, J B. Fisken; West Coast Power Co., Henry Berk.

per from Mine to Market" was shown under the direction of H. L. Hussey.

That evening the Executive Committee dinner meeting was held and the committee recommended for next year's chairman and vice-chairman respectively, Paul P. Ashworth, Telluride Power Co., and M. T. Crawford, Puget Sound Power & Light Co., to succeed themselves.

The Friday morning session, April 12, was divided between the Code Committee, with M. T. Crawford, Puget Sound Power & Light Co., chairman, and the talk on cooperative relationships between various company departments. All the material presented at this session is published in the following pages. The presence of A. B. Campbell, Edison Electric Institute, New York, with his excellent discussion of the recent changes in the NEC and NESC, as outlined hereinafter, was greatly appreciated by the delegates.

The Transmission and Distribution Committee of which R. J. Davidson, Pacific Power & Light Co., is chairman, held the stage Friday afternoon, with L. R. Gamble, Washington Water Power Co., vice-chairman of the committee, in charge of the program in Davidson's absence. The report on "Standards for Distribution Transformers" by Merrill DeMerit, West Penn Power Co., and Col. A. E. Herzberg, Wagner Electric Corp., representing respectively the EEI and the NEMA, is not published in full in these Proceedings though reference to it and citation of the available reports on the subject is included hereinafter. Several extra copies of the printed presentation by DeMerit and Herzberg are available in the office of the secretary for distribution to members while they last.

A display of the new transformer mountings was available all during the convention and DeMerit and Herzberg were constantly on hand to answer questions about the new transformer designs.

The session close with an illustrated lecture on the characteristics of glass under temperature and pressure by J. J. Torok, chief engineer, Power Line Insulator Division, Corning Glass Works.

Challenge to Private Enterprise

By J. E. E. ROYER
The Washington Water Power Co.

THROUGHOUT the length and breadth of America today our people take for granted an abundance of electric current, which, at the flip of a switch, goes to work for them in the home, on the farm, in the store or in the factory. We are well advanced in the electrical era—when a new form of power has become as common as the air we breathe or the water we drink. What would have seemed a miraculous luxury to our forefathers has become one of the accepted necessities of modern living.

Think of it! In the short space of 50 years the electric power industry has made electric service available to 22 million families—has put it to work in every nook and cranny of the land. From monster generators the strength of millions of horsepower surges through transmission lines, moves along distribution lines to do the work of America.

This tremendous accomplishment is the work of men like you who are sitting before me. Individuals who dreamed and planned — who met obstacles and overcame them—men who demanded and obtained the peak of efficiency from their physical and mental talents. You know what it has meant —you have bent over drafting boards and manipulated slide rules far into the night. You have burned the midnight oil seeking the solutions of the problems of the industry.

You have done a good job—just as other individuals in the transportation, in the automobile, in the communications industries have done a good job. But you cannot rest on your laurels. You are not through. You are, in fact, just entering a new job that is going to require even greater effort, greater enthusiasm, greater will to succeed than the task upon which you have been engaged.

Out of the depression there came many effects—the one which concerns us most was the vast program for the construction of power plants. Those who have had experience in the electric service industry realize that in the usual procedure of expansion, power plants are built in response to actual or potential demands and that as a rule, plant capacity should not be out of proportion to load. From the standpoint of economics that is the best rule to follow.

However, we know that many federal power plants, launched during the depression, had their justification partially in the need for the relief of unemployment. Today some of those plants are turning out kilowatt hours; others are nearing completion. The result, as it applies to the Pacific Northwest, is that we will have on hand a vast surplus of power plant capacity.

The prospect of this huge amount of additional power is a challenge to us—a challenge in the sense that we must accept the responsibility of cooperating in efforts to secure a full utilization of that power.

From the very beginning of this program the private utilities have indicated their willingness to assist in the marketing of that surplus power. Such cooperation is logical because no other agencies have had the wide experience necessary to do the job. As the construction task of each of these plants nears completion, the selling task moves to the front. And the business of selling can be done successfully only by private enterprise.

Where does the engineer fit into this picture? How can he assist in the task of disposing of this power? You are well aware of the fact that distribution cost is the largest item, by far, to make up the cost of a kilowatt hour. Let the engineer, therefore, turn his attention to the twin problems of distibution construction and maintenance. Let him concentrate on the study of new materials and techniques. There is much research to be done, new methods to be devised and tested on such problems as voltage regulation and interconnection.

From the time the electric service industry was started 50 years ago the watchword has been, "Better Service at Lower Cost." The result, as you know, has been that our customers have enjoyed continually better service at constantly decreasing costs. But we have not yet reached the goal—we must give still better service.

That is the assignment for the engineers as the utilities of the Northwest carry out their program of constructive cooperation in the sale of additional power. Upon the success of that program rests the fate of private enterprise.

I do not have to remind you of the necessity for the maintenance of private enterprise in America. Private enterprise has been the moving spirit in the progress of our country from its very beginning and by private enterprise we shall go forward.

Public ownership — political operation — gives no encouragement to invention, no incentive to ingenuity. Government cannot by edict create an Edison or a Steinmetz Genius is nurtured by private enterprise—it grows under the fierce light of practicability and competition in the open market where its work is examined and accepted.

Every engineer—every citizen—has a stake in free enterprise in this country. Because it is only through free enterprise that America can go ahead.

Accident Prevention Committee*

Survey of Company Traffic Accidents

By E. D. SEARING
Portland General Electric Co.

THIS year, for the first time, an effort has been made to assemble and analyze traffic accidents of member companies, to determine the frequency experience and comparative responsibility for accidents between company and public drivers. The belief was that due to more training and supervision, the company drivers would show a better record than the public drivers. It was also hoped that this study would prove of interest to member companies in arranging fleet insurance coverage.

Accident Classification

Before requesting traffic data it was necessary to secure uniformity in classification, to adopt definitions of: (1) what was to be considered a traffic accident; and (2) what was to be considered a preventable accident. The instructions in this connection, which were forwarded with requests for information to member companies, are as follows:

"The definition of a traffic accident as adopted by National Safety Council is as follows:

'Any accident in which the company's vehicle is involved, unless properly parked, where such accident results in death, personal injury, or property damage, regardless of who was hurt, what property was damaged, or who was responsible.'

"The following defines a 'preventable accident':

'Any accident in which the driver's vehicle is involved where such accident results in personal injury or property damage and which could have been prevented through the exercise of care, caution and/or judgment on the part of the driver.'

"The matter of legal responsibility or legal liability is not determined by the above definition as to preventability of traffic accidents."

Tabulation and Analysis

Vehicle and accident statistics were furnished by all 14 members companies for 1938 and 1939, and are assembled in Table I. Member companies are referred to by key members.

In general, the table shows that the number of vehicles and vehicle miles for most of the companies increased slightly in 1939 over 1938, while the number of accidents, compared in the same years, decreased in most cases.

Comparison as to similar conditions of driving may be selected as follows: Company key numbers 9, 10 and 12 apply to territories which include cities of over 300,000 population; numbers 6 and 7 apply to territories which include cities of over 125,000 population; while numbers 2, 3, 4 and 8 apply to territories which do not include any very large cities but do involve considerable open country driving.

The "miles per accident rate" and "number of preventable" and "number of unpreventable" accidents offer no logical comparisons. In some cases, data furnished on accidents by companies were not classified as to "preventable" and "unpreventable," but generally speaking, as a whole there appears no rhyme or reason by which close comparisons from these figures can be made. Nevertheless, this compilation is of interest by contrasting these variations. For instance, even with all conditions of driving considered, it seems out of line to find one accident for 635,000 mi. driven by one company and only 12,830 mi. per accident by another company. This is what I mean when I emphasize impossibility of making comparisons and contrasts.

Suggestions

It may not be the normal function of the author to offer suggestions. However, this is the first time such an undertaking has been attempted in the Northwest Association and suggestions seem in order. The following are offered for consideration:

1. A decision as to whether such an analysis is to be continued should be arrived at on the basis of:
   a. Expense of keeping up records in prescribed form
   b. Value of results of compilation.
2. An analysis as herein undertaken could be improved by:
   a. Making sure that member companies honestly report all of their traffic accidents, and
   b. Adopting a uniform basis for classifying traffic accidents as to preventability.

A further suggestion, providing it is decided to continue these analyses, is that damage be defined as amounting to a minimum of $5, $10 or even $25. This might help some companies to recognize "an accident." However, it is not in conformity with established practice and its adoption is questionable. Potentially, breaking a head-lamp lens or denting a fender is more serious, where personal injury is involved, than an upset involving hundreds of dollars in property damage only. For this reason, I question the advisability of changing

*D. W. Prairie, Northwestern Electric Co., chairman; G. I. Drennan, Pacific Power & Light Co., vice-chairman; B. C. Electric Railway Co., B. deM. Mertens; The California Oregon Power Co., C. C. Haggard; Eastern Oregon Light & Power Co., B. F. Lentz; Idaho Power Co., E. E. Beck; Mountain States Power Co., W. Smith; Portland General Electric Co., E. D. Searing, John S. Volpe; Puget Sound Power & Light Co., R. S. Maxwell, H. G. Winsor; Telluride Power Co., Paul P. Ashworth; Utah Power & Light Co., W. L. Cone; The Washington Water Power Co., J. B. Fisken; West Coast Power Co., Henry Berk.

Table I — Accidents of Member Companies—1938 and 1939

Co. Key No.	1938 Average No. of Vehicles	1938 No. of Vehicle Miles	1938 No. of Accts.	1938 Mi./Acct. Rate	1938 No. of P/A	1938 No. of U/A	1939 Average No. of Vehicles	1939 No. of Vehicle Miles	1939 No. of Accts.	1939 Mi./Acct. Rate	1939 No. of P/A	1939 No. of U/A
1	187	1,975,265	40	49,380	17	23	237	2,506,049	44	56,960	17	27
2	166	1,905,149	3	635,000	1	2	167	1,942,342	9	215,820	1	8
3	120	1,511,675	21	71,980	†	†	119	1,549,726	14	110,700	†	†
4	175	2,213,449	13	170,270	9	4	183	2,135,860	20	106,790	15	5
5	20	239,889	6	39,980	3	3	21	235,998	3	78,670	1	2
6	233	2,846,949	31	82,160	28	3	239	2,935,711	25	117,430	23	2
7	53	705,919	55	12,830	†	†	51	682,740	32	21,330	†	†
8	100	1,499,113	33	45,120	28	5	127	1,630,233	30	54,340	22	8
9	274	2,893,411	138	20,970	52	86	268	2,745,799	101	27,190	33	68
10	91	804,421	34	23,660	19	15	84	694,856	46	15,110	21	25
11	22	182,126	10	18,210	10	0	21	174,059	4	43,520	4	0
12‡	162	1,737,368	67	25,940	27	40	162	1,774,293	65	27,300	29	36
13	67	620,000	5*	124,000	3	2	67	599,000	6*	100,000	3	3
14	11	275,000	0	.....	0	0	12	312,000	0	.....	0	0
Totals	1,681	19,409,734	456	42,560	..	..	1,758	19,918,666	399	49,920	..	..

*Possibly some accidents not reported.
†Not classified.
‡Data for City Division only, which comprises only about one-half of motor vehicle operations.
"Mi./Acct. Rate" indicates number of miles per accident.
"P/A" indicates preventable accidents.
"U/A" indicates unpreventable accidents.

the nationally accepted definition of a traffic accident.

In conclusion, it appears, regardless of whether this study is continued in succeeding years, that much may be accomplished to the individual benefit of many of the member companies by exercise of more care in reporting and classifying accidents and applying the information thus gained to improve their experience rating. Any benefits resulting from this application make the value of this analysis worthwhile and justify the effort put forth in making it possible.

Acknowledgement and thanks to members of the accident prevention committee in recognition of assistance and cooperation.

Discussion

D. W. PRAIRIE: Traffic accidents cost money and good will. There was a case of two boys riding one bicycle making a quick stop to avoid colliding with a truck, and the truck made a quick stop also so that there was no contact between the truck and the bicycle. One boy was slightly hurt in falling off the bicycle. The accident, for which the truck was apparently in no way to blame, cost the company owning the truck $12,000.

C. E. KLAUS: The experience of Portland Traction Co. has shown it to be advisable to settle out of court every claim that seems justified. The company conducts a safety contest giving away turkeys as awards for safe performance. This is one application of the merit system.

PRAIRIE (in answer to questions): Undoubtedly many small accidents are not reported in the summary in Mr. Searing's paper. There is a question as to the definition of a traffic accident and I believe we should follow the National Safety Council definition to the letter, namely, that any accident causing any property damage, no matter who causes it and regardless of whether or not there was any contact with a human being, should be a reportable accident. If there is no damage that costs anything for repairs, it is not a reportable accident.

E. E. BECK: The traffic accident record of Idaho Power Co. shows the greatest number of accidents in the city and the greatest severity in the country. As to the expense of keeping records of traffic accidents, we could speed up our reports and reduce the cost of them if we used the National Safety Council form.

One means of reducing these accidents is to give our drivers a good tool to work with. In other words, paint up our cars and keep them in good order.

PRAIRIE: Some companies are not particular about keeping up minor repairs such as dented fenders. This probably means that what would be considered a minor accident in one company would be no accident at all in other companies.

PAUL P. ASHWORTH: There is a citizens' committee in Salt Lake that concerns itself with traffic accidents, and they have devised a form of report and keep a comprehensive compilation of statistics. They find more accidents on straight roads than on curved, more on concrete than on asphalt or gravel, more on dry pavement than on wet. This points to the conclusion that drivers are more careful when conditions of the road are bad. Thursday is the worst day of the week for accidents, and early morning is the most hazardous time of day. Next to early morning comes the late afternoon. This points to lack of lighting as being a contributing cause. Statistics also show the relation of weather and other physical factors to accidents, as well as human factors such as illness of the driver, liquor, etc.

GEN. H. G. WINSOR: This study of Mr. Searing's gives us a picture of the situation, and points to what we ought to do. Operating men are more important in the solution of traffic accidents than the Accident Prevention Committee. Mr. Searing's report indicates there are discrepancies in reporting. We ought to try to work for uniformity of these reports so that our comparative picture would be more accurate. It is encouraging to note that interest is being taken in this subject. If we use the material from these conferences in our accident prevention work, we will make headway.

O. L. LEFEVER: It is apparent that speed is the most prevalent cause of traffic accidents. Carelessness also is a large contributing factor, but many accidents happen to careful drivers. The psychological attitude of the driver is important. There are times when some incident of the road makes a driver mad, and creates a state of mind that makes him ripe for an accident.

J. E. YATES: There is a political aspect to the situation. One of our candidates for mayor contributed Portland's high accident record to the utility companies by saying that street lighting rates were so high the city couldn't afford good lighting and poor lighting was the cause of so many accidents.

D. A. HORD: We have had many cases of automobiles running into poles. By placing reflector buttons on such poles, we have stopped this to a large extent. Northwestern Electric installed 100 of these buttons on poles most likely to be hit by motorists.

J. B. FISKEN: This traffic accident report should be continued and should perhaps be amplified by a statement of the cost of some of these accidents. We ought also to bring out a comparison between city and country driving.

MR. PRAIRIE: We had very bad weather conditions in January with many slippery days, but we did not have a single traffic accident. This indicates that drivers are more cautious under these conditions. When the pavement gets dry, they ease up on vigilance.

C. C. HAGGARD asked if the member companies were using a merit or penalty system. We are using a system of penalizing the drivers having accidents in one division of The California Oregon Power Co. This is effective, but it is a negative approach. I would favor a merit system for successful performance.

BECK: It is possible to use both, but there is danger that you may glorify either beyond their importance. I don't believe in going far in either direction.

E. A. WOODHEAD: A man should not be credited with avoiding accidents if he has not at the same time done every other phase of his work efficiently and well. The merit system should be applied to every other phase of work, if it is applied to accident prevention.

J. R. ROBERSON: Puget Sound Power & Light Co. has a praise and censure system. We have reduced accidents by making the supervisor responsible.

(A canvass of the companies present indicated that no companies used a fully worked out merit and penalty system. Some used a praise and censure system in modified form.)

(The question of the advisability of using governors was raised.)

H. R. WEST: We tried in the Idaho Power Co. using governors on some service cars. The criticism was that they should be on all cars or on none. One of our men in a car with a governor almost had head-on collision because he had been used to driving without a governor.

PRAIRIE: Governors placed on Model-A trucks cut down the rate of wearing out brake-bands when set for 35 mi. per hr. Governors impair the efficiency of operation of a car.

PAUL L. MARBLE: Most of the traffic accidents in Seattle occur around daylight and dusk, and the worst accidents occur on the most highly engineered highways.

BERKELEY SNOW: Portland, which has a very bad traffic accident record, is setting up a traffic commission of non-paid commissioners with a paid staff to give scientific attention to improving traffic safety in the city. Traffic safety people recognize the three "Es" that have a bearing on traffic safety in a

given jurisdiction: Engineering, having to do with the placement of traffic controls, such as signals, lights, etc.; Education, meaning the education of the public on safe driving rules; and Enforcement, meaning fair and adequate enforcement of traffic laws by the police authorities.

Personal Injury Summary for 1939

Compiled by DONALD W. PRAIRIE
Northwestern Electric Co.

ACCIDENT experience for 1939 showed a definite trend toward improvement over the preceding three years, both in frequency and severity. With an increase of 3.47% in man-hours' exposure, there were recorded exactly the same number of lost time accidents as in 1938, which has the effect of showing a reduction of 3.73% in frequency. The severity rate dropped from 3.003 in 1938 to 2.110 in 1939, a reduction of almost 30%. This was due, in a large part, to the fact that there were only 6 fatalities in 1939 as compared with 10 in 1938.

An analysis of the figures representing days lost from work shows that the non-fatal accidents of 1939 were greater in severity than those of 1938.

To illustrate: Of 66,389 days lost in 1938, 60,000 were from fatalities, leaving 6,389 to non-fatalities. Of 48,448 in 1939, 36,000 were from fatalities, leaving 12,448 days lost by non-fatal accidents. There were four permanent, partial-disability time charges which accounted for 2.010 of these days.

As usual, the outstanding causes of accidents were carelessness and poor judgment on the part of the workmen themselves, in the estimation of the safety men of the companies reporting. Without exception, the greatest number of accidents in each company classified, fell into these two groups. The figures are 165 out of 328, or 50%.

Linemen and groundmen enjoy the questionable distinction of having the most accidents; the numbers being 71 in each group, for a total of 142 accidents out of the 328. Their mortality rate, however, shows marked improvement over last year's. There were only two fatalities in 1939 as against 6 in 1938.

One of the most remarkable facts brought out by this study is that certain types of accidents occur in greatest frequency year after year. A glance at the 1938-39 comparison will show the greatest frequency in almost identical types of accidents in both years.

The Nature of Injury classification has the same regularity of frequency in certain groups as has the Type of Accident classification.

This information should be of great assistance to safety men and operating supervisors in training the carelessness out of their workmen. It seems to indicate that there are certain unsafe working practices which are common to the industry and could be eliminated by constant supervisory attention to doing the job the safe way. That this can be done and is being done, will be amply proven to anyone who looks back over the record of the findings of our Accident Prevention Committee during the last 11 years, which are shown on the statistical summary of this report.

Discussion

(The question was raised as to the effect of the wage and hour law on safety and accident prevention meetings.)

D. W. PRAIRIE: We conduct safety meetings on company time.

E. E. BECK: If the meeting is a Red Cross meeting, which is presumed to benefit the individual, the meeting can be conducted outside of company time. Company safety meetings, however, must be on company time.

Utilization Committee*—Illumination†

A Design for Highway Lighting

By E. F. ANDERSON
Portland General Electric Co.

A CONCRETE example of highway lighting is the subject of this paper, namely, Highway U.S. 99-E in Oregon, from Portland to Salem. This 50-mi. stretch passes through a number of towns of 5,000 population and less as well as through strictly rural areas.

The design of a highway lighting system must take into consideration a variety of factors, as follows.

Volume of Traffic

Traffic flow maps are available showing the number of vehicles, both truck and motor car, using the highway under consideration. The number of vehicles per 24 hr. passing a given point, in both directions, is indicated by the width of a shaded area adjacent to the highway.

A flow map of the northwestern section of Oregon shows that the traffic density varies from 5,000 vehicles per 24 hr. near Oregon City to 3,700 through the Willamette Valley and increases to 5,000 at Salem. This highway has a greater traffic density throughout its 50 miles than any other Oregon highway of comparable length. Traffic on 99-E near Portland city limits approaches 9,000 vehicles per 24 hr.

Highways passing through cities and towns are classified as thoroughfares. The Illuminating Engineering Society has classified the traffic on these thoroughfares as follows: *Heavy traffic:* over 1,200 cars per hr. maximum in both directions; *Medium traffic:* 500 to 1,200 cars per hour maximum in both directions; *Light traffic:* up to 500 cars per hour maximum in both directions.

The illumination levels and type of luminaires chosen are dependent upon the classification above.

Accident-Density Maps

Accident-density maps show the number and location of accidents, both fatal and property damage. A study of these will show locations where special lighting should be installed, for example: at highway intersections, traffic lanes and public meeting places.

Fig. 1 is an accident-density map of the section under discussion. The dots represent accidents in which property damage and minor injuries resulted. The crosses indicate fatalities.

A change in color of the light at danger points from that used in the main stretch of highway is now being more widely used. For example, if an intersection is to be brought to the attention of a motorist driving on a stretch of highway lighted with sodium lamps, a mercury lighting unit casting a blue glow may be used at this intersection.

*John Bankus, Portland General Electric Co., chairman; O. D. Lanning, Eastern Oregon Light & Power Co., vice-chairman; and members of sub-committees on Illumination and Utilization Devices.

† F. H. Murphy, Portland General Electric Co., chairman; B. C. Electric Railway Co., R. Hall; Idaho Power Co., O. C. Mayer; Northwestern Electric Co., J. C. Plankinton; Pacific Power & Light Co., G. B. Bocarde, J. K. Moore; Puget Sound Power & Light Co., C. T. Bakeman; Utah Power & Light Co., J. C. Littlefield; The Washington Water Power Co., Ladner V. Ross.

Table I—Design and Cost Data for U.S. 99E Portland to Salem, Oregon

	Section 1 — From south end of Union Avenue overhead viaduct to south limits of Portland.		Section 2 — South city limits of Portland to River Road at Milwaukie.		Section 3 — River Road at Milwaukie to north city limits at Oregon City.		Section 4 — Oregon City. (North city limits to S. P. Undercrossing.)		Section 5 — S. P. undercrossing to south city limits of Oregon City.		Section 6 — South city limits of Oregon City to north city limits of Canby.		Section 7 — Canby north to south city limits at Molalla River Bridge.		Section 8 — South city limits of Canby to north city limits of Aurora.		Section 9 — Aurora north of south city limits.		Section 10 — South city limits of Aurora to the north city limits of Salem.	
	Design	Cost	Design	Cost	Design	Cost	Design	Cost	Design	Cost	Design	Cost	Design	Cost	Design	Cost	Design	Cost	Design	Cost
Distance (Miles)	3.281		1.598		5.485		2.677		1.064		6.910		1.442		2.786		0.736		22.210	
*Traffic Density	8,000		8,000		8,000		8,000		6,000		4,400		4,400		4,000		4,000		5,000	
Pavement — Width	60		44		44		60		42		24		60		20		60		24	
Pavement — Type	Concrete		Concrete		Concrete		Concrete		Concrete		Concrete		Concrete		Concrete		Concrete		Bitulithic	
Pavement — Lanes	4		4		4		4		4		2		4		2					
Luminaires — Type	Incand.		Incand.		Sodium		Incand.		Incand.		Sodium		Incand.		Sodium		Incand.		Sodium	
Luminaires — Lumen Intensity	0.60		0.60		0.46		0.60		0.60		0.55		0.60		0.55		0.60		0.55	
Luminaires — Size (Lumens)	4,000		4,000		10,000		4,000		4,000		10,000		4,000		10,000		4,000		10,000	
Luminaires — Spacing ft.	62.5	Stag'd	62.5	Stag'd	170	Stag'd	62.5	Stag'd	62.5	Stag'd	200	Side	62.5	Stag'd	200	Side	62.5	Stag'd	200	Side
Luminaires — Height ft.	25		25		25		25		25		25		25		25		25		25	
Luminaires — Number	282		138		170		226		90		185		124		75		62		590	
Luminaires — Cost		$ 5,400		$ 2,640		$11,280		$ 4,325		$ 1,723		$12,275		$ 2,373		$ 4,976		$ 1,187		$39,146
Luminaires — Labor		564		276		340		452		180		370		248		150		124		1,180
Poles — Number	282		138		340		226		90		185		124		75		62		590	
Poles — Type	Steel		Steel		Wood		Steel		Wood		Wood		Wood		Wood		Wood		Wood	
Poles — Height ft.	30		30		35		30		35		35		35		35		35		35	
Poles — Cost		$20,000		$10,000		$3,910		$16,159		$ 1,035		$ 2,127		$ 1,426		$ 862		$ 713		$ 6,785
Poles — Labor		2,820		1,380		2,900		2,260		765		1,570		1,050		750		530		5,020
Wire — Size	No. 4 ACSR.		No. 4 ACSR.		No. 4 ACSR.		No. 4 ACSR.		No. 4 ACSR.		No. 4 ACSR.		No. 4 ACSR.		No. 4 ACSR.		No. 4 ACSR.		No. 4 ACSR.	
Wire — Feet	36,200		17,800		61,000		30,000		12,000		77,000		16,000		31,000		8,200		247,000	
Wire — Cost		$ 689		$ 339		$ 1,162		$ 571		$ 230		$ 1,467		$ 304		$ 590		$ 1,560		$ 4,700
Wire — Labor		217		107		370		180		72		470		100		186		500		$1,500
**Pole Hardware and Insulators — Cost		$ 2,710		$ 1,330		$ 2,516		$ 2,170		$ 1,446		$ 2,850		$ 1,993		$ 1,155		$ 996		$ 9,086
**Pole Hardware and Insulators — Labor		2,260		1,100		1,360		1,800		720		1,500		1,000		600		500		4,700
Constant Current Transformers Including Structure — Number	3		2		2		2		1		2		2		1		1		6	
Constant Current Transformers Including Structure — Size (kw.)	25		20		25		30		25		1-25, 1-30		20		25		20		5-30, 1-25	
Constant Current Transformers Including Structure — Voltage	2,400		2,400		2,400		2,400		2,400		2400 & 7200		7,200		7,200		7,200		3-7200, 3-2400	
Constant Current Transformers Including Structure — Cost		$ 3,594		$ 2,176		$ 2,396		$ 2,556		$ 1,198		$ 2,633		$ 2,446		$ 1,355		$ 1,223		$ 8,113
Constant Current Transformers Including Structure — Labor		270		180		180		180		90		180		180		90		90		540
Total Cost Less Stores Expense & O. H. — Material		$32,393		$16,485		$21,774		$25,781		$ 5,632		$21,352		$ 8,542		$ 8,936		$ 5,679		$67,830
Total Cost Less Stores Expense & O. H. — Labor		6,131		3,043		5,350		4,872		1,827		4,090		2,578		1,776		1,294		12,940
Material + 10%		$35,632		18,134		$23,951		$28,359		$ 6,195		$23,489		$ 9,396		$ 9,830		$6,247		$74,613
Labor + 20%		7,357		3,652		6,420		5,846		2,193		4,908		3,094		2,132		1,552		15,528
Total Cost		$42,989		$21,786		$30,371		$34,205		$ 8,388		$28,395		$12,410		$11,962		$ 7,799		$90,141

** This item includes cost of luminaire brackets for wood poles. Brackets for steel poles included in cost of steel poles.
* Traffic density in vehicles per 24 hours (truck and motor car).

Highway Design Data

These data should cover such items as highway widths, curves, tangents, contours, types of road surfacing and number of lanes. The spacing and location of units depend on these.

Future Plans

Consideration must be given to contemplated changes in the present highway, as to routing, widths and importance as a link in a more extensive highway system. The installation must be such as to simplify future extensions.

Power Source

Maps must be available to show the location of power lines of proper voltage and capacity relative to the highway.

Equipment

Equipment is determined by types available and their relative efficiencies.

Lighting

The questions here are: (1) Whether direct or silhouette lighting is desired; (2) Whether incandescent or sodium vapor lighting is to be used. (3) Light intensity desired. All depend on the traffic volume, highway width, number of lanes and type of pavement.

Architectural Features

The design must be in keeping with the territory through which the highway passes, and it must insure uniformity of installation as improvements are made.

Economy

Economy of operation must, of course, never be lost sight of.

The highway under discussion was divided into 10 sections for the purpose of segregating city lighting from rural lighting, and lighting in one county from that in another county. With this break-up, definite sections could be financed, installed, and operated as separate units.

Steel poles were considered in sections within the city limits of Portland and Oregon City and section No. 2, which covers the stretch of highway from Milwaukie, because of the permanency of these sections relative to future plans of the highway. In all other sections, wood poles were used.

The light intensities in lumens per square foot of highway were taken from the IES tables on recommended light intensities for highways and city thoroughfares.

Table I shows the design and cost data for each of the sections. Table II summarizes the totals.

In conclusion, the author wishes to express his appreciation to Earl Snell,

Fig. 1

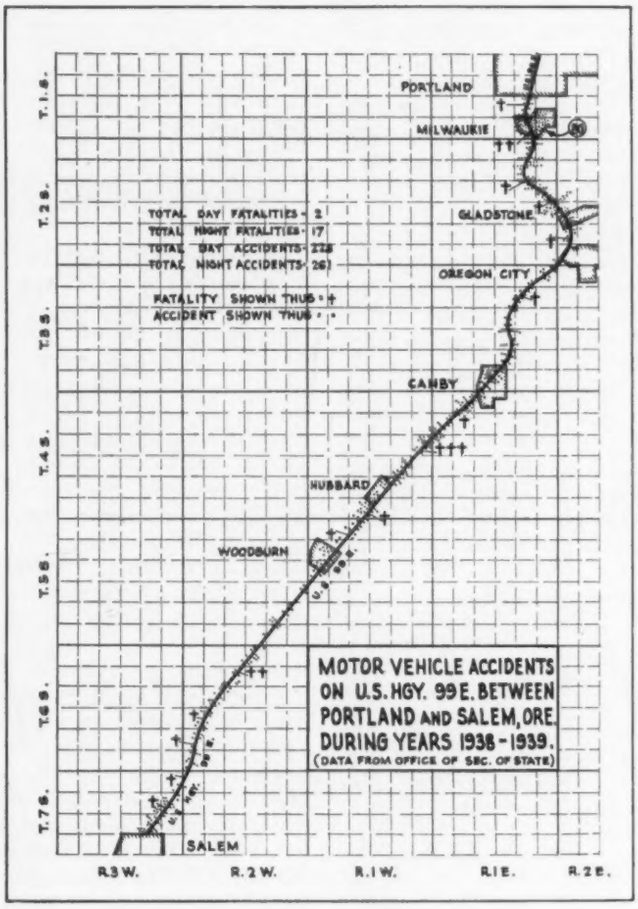


Table II—Summary of Design and Cost Data

(a)	Total cost of installation	$288,526.00
	Total number of lighting units	1,942
	Average cost per unit	$ 149.00
(b)	Total distance in miles	48.189
	Average cost per mile	$ 6,000.00
(c)	Total kw. of lighting installed	517
	Average kw. of lighting per mile	10.72
	Average cost per kw. of lighting	$ 558.00
(d)	Total miles of sodium lighting	37.391
	Average cost per sodium unit	$ 157.50
	Average cost per mile of sodium lighting	4,340.00
(e)	Total miles of incandescent lighting	10.798
(f)	Total miles of incandescent lighting using steel poles	7.556
	Average cost per incandescent unit using steel poles	$ 153.00
	Average cost per mile of incandescent lighting using steel poles	13,100.00
(g)	Total miles of incandescent lighting using wood poles	3.242
	Average cost per incandescent unit using wood poles	$ 103.60
	Average cost per mile of incandescent lighting using wood poles	8,800.00
(h)	Capital Investment:	
	1. Total cost of installation	$288,526.00
	2. Fixed charges assumed at 10% per year	28,853.00
(i)	Operating Cost: (Equipment maintenance, lamp renewals, patrolling and inspection)	
	1. Total per year	$ 23,000.00
	2. Cost per mile per year	477.00
	3. Cost per unit per year	12.00
(j)	Energy Cost:	
	1. Total kilowatt-hours per year based on 4,000 hours burning per year	2,068,000
	2. Energy cost for 2,068,000 if evaluated at 1c per kwh	$ 20,680.00
	3. Yearly cost per mile	430.00
	4. Yearly cost per unit	10.66
(k)	1. Total yearly cost	72,533.00
	2. Yearly cost per mile	1,500.00
	3. Yearly cost per unit	37.40

Secretary of State, and his staff, the State Highway Department Engineers, and to F. T. Fowler, City of Portland traffic engineer, for their valuable aid in obtaining accident, traffic flow and highway data. He also wishes to express his thanks to H. M. Baxter of Portland General Electric Co. for his aid in preparing charts and diagrams.

Discussion

JOHN BANKUS: (in answer to question): The units on the curves are designed to get the full effect of silhouette lighting. No methods of financing the cost of such a lighting system is suggested in the paper. This will depend entirely on local conditions.

PAUL P. ASHWORTH raised the question concerning the operating cost as outlined in Mr. Anderson's paper, stating that the cost of the units per year at $12.00 seemed low.

J. R. ROBERSON: The cost per unit is $7, and they burn about 2,000 hr. (2,015 hr. is the average on the stretch of highway lighting near Tacoma.) Hence, per year, this item of cost would be $14 per globe. Another $5 should be added for inspection, maintenance, etc., bringing the cost per unit per year to $19.

Proof of the Pudding

Safety highway lighting in the State of Washington

By PAUL L. MARBLE
Puget Sound Power & Light Co.

IF the funerals for all of the 32,000 persons who were killed by automobile accidents during 1939 were held the same day, the procession would form a gigantic parade reaching from Seattle to New York, and those persons with non-fatal injuries could form a guard of honor standing on each side, flanking the column. Such a dramatic procession would surely make headlines in all the newspapers of the world and there would be a great cry to do something about it. Experience has proved that something can be done about it. Through a safety program and through adequate lighting at the proper places of danger, these deaths and accidents can be cut one third. But in what way do these large national figures become of interest to this particular group? Let us bring the problem closer home.

It is said by Carl Fritts, Washington State highway safety engineer, that automobile accidents cost the state $20,000,000 a year, and 38% of the fatalities occur on primary state highways. Close to 65% of all fatal accidents occur at night even though night hours have only one fourth of the traffic. This means that night driving at present

is more than six times as dangerous as daytime driving. It is a well recognized fact that the major cause of night time accidents is less visibility. The driver simply cannot see as well. Properly designed safety highway lighting can improve visibility to approaching daytime safety.

To the extent it can be shown that safety lighting can prove its worth by saving in accidents and death, by increased use of the valuable highways, by greater convenience and pleasure while driving—to just this extent will the modest start in lighting for safety in Washington be extended. As engineers, as taxpayers and as citizens, you will inquire, is there a need, and will the investment pay out? I believe that both the need and the cost justification can be proved. Installations already have been made in this state showing the need, proving the advantages and recognizing the acceptance. Here are some of them:

In 1935 a pioneer installation of 66 10,000-lumen sodium-vapor highway lighting units was installed south of Tacoma. At the time this was the largest installation in the United States, in fact, there were only 25 other installations in the country, most of them only a few units at intersections and particularly dangerous short stretches of highway. This lighted section covering 2.9 mi. was built at $4,000 per mi. The maintenance and power costs have been $647 per year per mile.

There have been *no fatalities* in over four years although there have been several fatalities each year on the unlighted sections of highway on both sides. During 1939 lighting was extended from this highway as follows:

Through the city of Tacoma, 5.5 mi., 158 units costing $24,621.73. East of Tacoma, 6.14 mi., 87 units costing $15,431.19.

These three sections now give a lighted highway over 11 mi. in length. Average cost per mile was $4,668. The sodium-vapor lighting units are 10,000-lumen and are mounted 25 ft. above the roadway extending by mast-arm about 2 ft. over the pavement edge. A staggered arrangement is used spaced 175 to 225 ft. apart. This most recent installation has been in use for such a short time no representative figures are available to show accident trends.

For the most part, observations of those using the lighted highway are very favorable. The area lighted is through a very bad fog belt and the lighted roadway is much easier to follow in the fog. For this reason, the golden sodium-vapor lights are called "fog lights" by many who believe that they penetrate fog. However, experiments have indicated that there is nothing about the mono-chromatic light of sodium-vapor that penetrates fog better than an equal level of illumination from any other light source.

Experience and research indicate that the units could to advantage be extended closer to the center of the right-hand traffic line, placing the path of apparent brightness better in line with the traffic. The experimental installation would also indicate that the principle of locating the luminaires on the outside of curves, instead of by a continued staggered arrangement, would in many cases, depending on the angle of curve, give a more effective use of the light. The placing of the lighting units beyond an intersection or spot of danger will silhouette an obstruction, providing better visibility. Experience shows that placing of the luminaires is usually of equal importance to the lumen size of the lighting unit. Engineering, both construction and safety features, is essential for satisfactory results. Engineers who are responsible for the designing of modern safety lighting must know and design for the proved principle of seeing by silhouette.

Two other interesting sodium-vapor lighting installations will be in use soon in western Washington. They are the highway lighting over the Tacoma Narrows Suspension Bridge and the Lake Washington Bridge in Seattle. The Lake Washington Bridge, when finished, will be the world's longest floating bridge, a mile and a quarter across the lake proper, although the total project is much longer. The bridge itself will have 131 10,000-lumen highway-type units. They will be double-spaced, 175 ft. apart, mounted by special standards 24 ft. above the four lane pavement.

The twin-bore highway tunnel under Mt. Baker Ridge entering the city of Seattle, having a length of 1,465 ft., will be lighted with 41 10,000-lumen sodium-vapor luminaires designed especially for tunnel use. These enclosed-type units will be mounted flush with the ceiling of the tunnel, in the center of each two-lane highway, and will be spaced 80 ft. apart.

Walls and ceiling of the tunnel will be painted a flat white. Sixteen mercury luminaires with 16,000 lumen lamps will be installed at the tunnel entrance and will be used for daytime lighting to off-set the excessive day light brightness when entering the tunnel. Calculations show the footcandle levels will taper from 40 at the entrance to 5 in the tunnel.

Flood lighting will also be employed in parking spaces and special hot-cathod fluorescent lighting will illuminate under the marquees at the toll plaza. The whole installation will be extremely interesting and will warrant a visit when finished.

The Tacoma Narrows Suspension Bridge will be lighted in much the same way, being under the Washington Toll Bridge authority.

Judging from the interest aroused from the present highway lighting, its enthusiastic reception is assured. The great number of accidents and loss of life show the need. But now for the "Proof of the Pudding." Will it pay from a dollars and cents standpoint?

Damage to property, doctor bills, hospitalization, loss of time, court litigations, etc. are all very real. The loss of a life valued as a human machine is also real and may be measured in dollars. Here are the cost figures supplied by the State traffic safety engineer. The average accident damage to the automobile is $150. The doctor and hospital expense for the average non-fatal accident is $425. The value of a life as a human working machine is valued at $11,500. Using these figures, the costs of night time accidents and fatalities on the highway between Olympia and Everett, a stretch of 90 mi., for 1938 were more than a quarter of a million dollars.

Abundant statistics in Washington and elsewhere go to prove that at *least* one-third of these night-time accidents and fatalities can be eliminated. This one-third saving amounting to some $85,000 per year would not only pay the yearly maintenance and power costs, but would retire the investment of lighting this highway in less than five years. As investments go in these days, this looks like a good one. With the abundant low cost power now available throughout the west, some of the kw.-hr. can well be used to illuminate the trunk highways and the danger spots of many secondary highways. This plan should also go hand in hand with a general safety program and a program of lighting for safety and traffic needs in the towns and cities.

It can well be said that we pay for street and highway lighting whether we get it or not.

Highway lighting has other advantages in addition to the savings resulting from reducing accidents. The lighting of main trunk highways considerably reduces the strain and effort incidental to night driving. It extends the usefulness of the highway by encouraging the use during dark hours and relieving heavy congestion of late afternoon driving. It frees the highway for safe comfortable driving from the night-time fogs that often throttle the regular flow of traffic.

There are other losses even greater than we have shown. They cannot, perhaps, be measured in dollars, but they are nevertheless just as real. These in-

clude suffering and the loss of loved ones.

Let us again consider the toll. Close to 2,100 lives were lost in Washington in the past four years. Our national fatalities during the past seven years have been equal to death from all of the wars in our history. The 1939 funeral procession reaches from coast to coast. Surely there is a need for life-saving.

Today's Situation Re Fluorescent Light

By F. H. MURPHY
Portland General Electric Co.

FLUORESCENT lighting is advancing rapidly. Every branch of the industry needs to keep abreast of the developments in order to determine how extensive use will affect that branch's own field of operations.

At present, four types of products are endeavoring to supply the demand.

1. The Mazda fluorescent lamp manufactured by the Mazda incandescent lamp manufacturers. These companies are responsible for the pioneer development of this type of lighting and for most of the lamps now available.

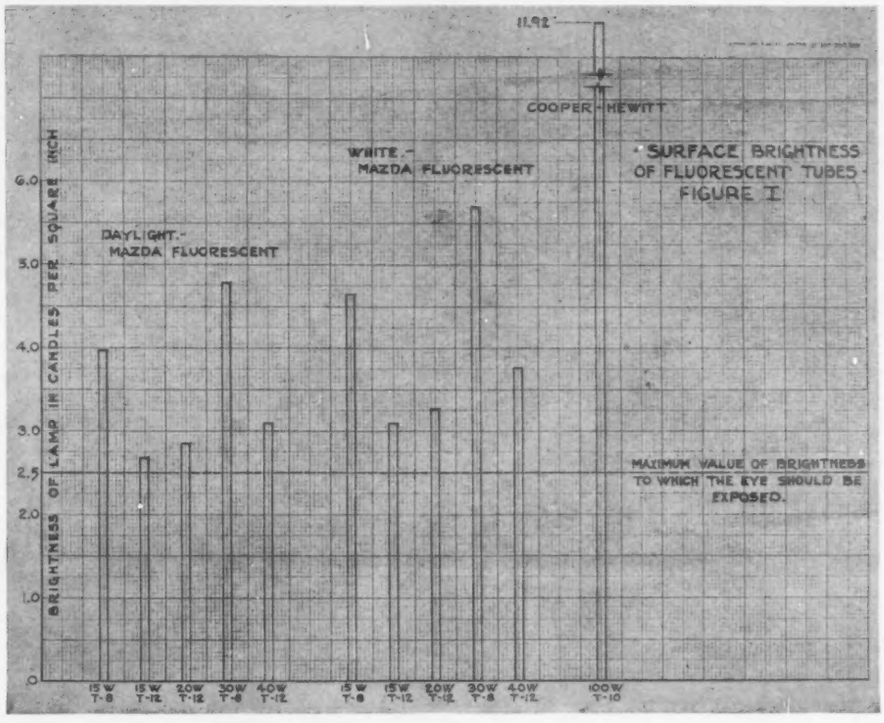
2. The Cooper-Hewitt development, which consists of a single size unit. Although it is at present the largest high-efficiency unit in this general field, it is a specialized development of the original mercury arc.

3. The hot-cathode, Zeon tubing unit, a product of the Claude-Neon interests, which is a high-voltage continuous tube and a specialization of their sign-lighting product.

4. The cold cathode Fluorescent tubing unit which is the product of the independent Neon sign manufacturers. It is also a high-voltage continuous tube a specialization of *their* sign lighting product.

All four have in common: the use of a transparent tubing coated on the inside with a fluorescent powder; the use of mercury vapor as the activating gas (with the exception of a few colors for which Neon gas is used), an inherently low power factor, and non inter-changeability of units of different sizes of lumen output. This latter limitation presents quite a contrast to the great flexibility of our present incandescent system, which also includes a power factor of 100% and an absence of auxiliary equipment.

From the beginning of electric lighting we have endeavored to secure as wide a range of sizes (based upon light output) as possible. Simplicity and interchangeability of units of varying seemed to be basically desirable, and the 100% power factor of large light-



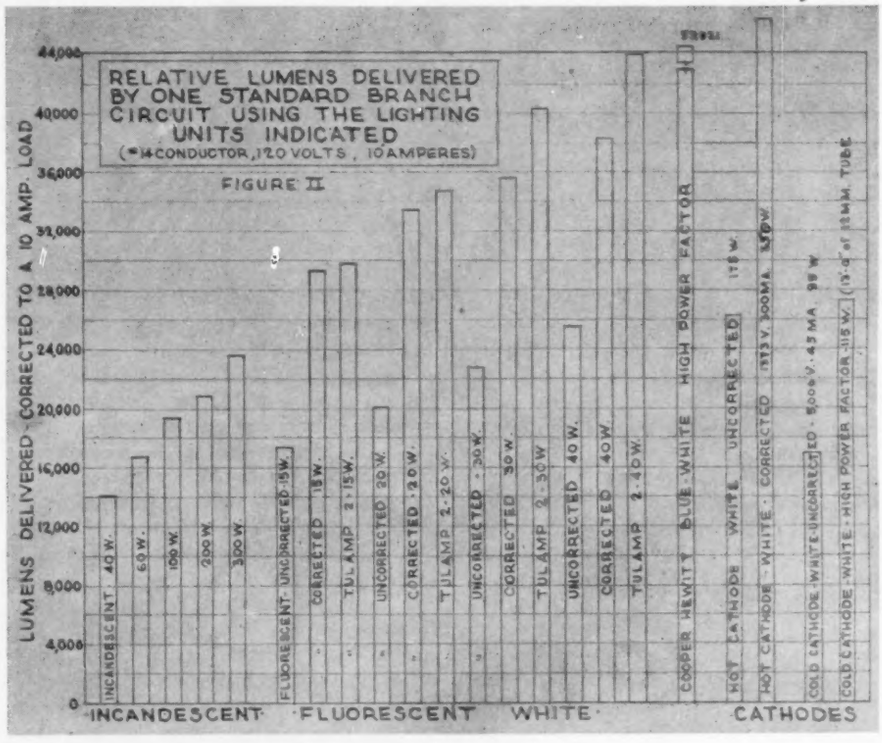

RELATIVE LUMENS DELIVERED BY ONE STANDARD BRANCH CIRCUIT USING THE LIGHTING UNITS INDICATED
(*14 CONDUCTOR, 120 VOLTS, 10 AMPERES)
FIGURE II
LUMENS DELIVERED - CORRECTED TO A 10 AMP. LOAD
INCANDESCENT
FLUORESCENT
WHITE
CATHODES

Table I—Fluorescent Lamp Data

	Mazda Fluorescent				Cooper Hewitt
Dimensions (inches)	**1x18**	**1.5x24**	**1x36**	**1.5x48**	**1.25x51**
Nominal Lamp Watts	**15**	**20**	**30**	**40**	**100**
Nominal Lamp Amperes	.3	.35	.33	.42	.9
Circuit Volts	110-125	110-125	199-250 110-125	199-250 110-125	210-250 110-125
Rated Life in Hours	2500	2500	2500	2500	3000
Lumen Output:					
White	585	900	1440	2120	
Daylight	495	760	1230	1800	
Blue White					5000
Foot Lamberts:					
White	2050	1650	2475	1750	
Daylight	1750	1400	2125	1480	
Blue White					*5390

* Estimated Values.

Table II—Lumens Delivered by One Standard Branch Circuit Using Lighting Units Indicated

No. 14 Conductor, 120 volts, 10 amperes

Unit Designation	Auxiliary	Lamp Watts	Auxiliary Watts	Total Unit Wattage	No. of Units	Power Factor %	Circuit Amperes	Circuit Watts	—Lumens Delivered— Actual	Corrected to a 10-amp. load
MAZDA INCANDESCENT										
I.F.		40		40	30	100	10.0	1200	14,040	14,040
I.F.		60		60	20	100	10.0	1200	16,680	16,680
I.F.		100		100	12	100	10.0	1200	19,440	19,440
I.F.		200		200	6	100	10.0	1200	20,880	20,880
I.F.		300		300	4	100	10.0	1200	23,640	23,640
MAZDA FLUORESCENT										
White	Uncorrected	15	5.0	20.0	33	55	10.0	660	17,325	17,325
Daylight	"	15	5.0	20.0	33	55	10.0	660	14,850	14,850
White	Capacitor Type	15	4.5	19.5	56	90	10.0	1092	29,400	29,400
Daylight	" "	15	4.5	19.5	56	90	10.0	1092	25,200	25,200
White	Tulamp Type	30	10.0	40.0	29	95	10.2	1160	30,450	29,853
Daylight	" "	30	10.0	40.0	29	95	10.2	1160	26,100	25,588
White	Uncorrected	20	5.0	25.0	26	55	9.85	650	19,760	20,061
Daylight	"	20	5.0	25.0	26	55	9.85	650	17,160	17,422
White	Capacitor Type	20	4.5	24.5	44	90	9.98	1078	33,440	33,507
Daylight	" "	20	4.5	24.5	44	90	9.98	1078	29,040	29,098
White	Tulamp Type	40	10.0	50.0	23	95	10.09	1150	34,960	34,648
Daylight	" "	40	10.0	50.0	23	95	10.09	1150	30,360	30,089
White	Uncorrected	30	8.0	38.0	18	55	10.36	684	23,620	22,800
Daylight	"	30	8.0	38.0	18	55	10.36	684	19,980	19,285
White	Capacitor Type	30	10.0	40.0	27	90	10.00	1080	35,640	35,640
Daylight	" "	30	10.0	40.0	27	90	10.00	1080	29,970	29,970
White	Tulamp Type	60	14.5	74.5	16	95	10.45	1192	42,240	40,411
Daylight	" "	60	14.5	74.5	16	95	10.45	1192	35,520	34,000
White	Uncorrected	40	13.0	53.0	14	60	10.30	742	26,320	25,553
Daylight	"	40	13.0	53.0	14	60	10.30	742	22,400	21,747
White	Capacitor Type	40	13.0	53.0	21	90	10.30	1113	39,480	38,330
Daylight	" "	40	13.0	53.0	21	90	10.30	1113	33,600	32,621
White	Tulamp Type	80	17.5	97.5	12	95	10.26	1170	45,120	43,976
Daylight	" "	80	17.5	97.5	12	95	10.26	1170	38,400	37,427
COOPER-HEWITT FLUORESCENT										
Blue-White High P.F.		100		100.0	11	90	10.20	1100	55,000	53,921
HOT-CATHODE FLUORESCENT										
White Uncorrected		175		175.0	3	50	9.00	525	23,625	26,250
White Capacitor Type		350		350.0	3	85	10.29	1050	47,250	46,307
COLD-CATHODE FLUORESCENT										
White Uncorrected		95		95.0	6	47.5	10.00	570	17,004	17,004
White High P.F.		115		115.0	10	92.0	10.40	1150	28,340	27,250

ing loads has been a "saving grace" for distribution systems.

We are now confronted with a system which seems to present the very antithesis of all our ideas of what constituted the basic requirements of good lighting units. The problem appears to be: How far can the manufacturers go in adapting this new system to meet our needs and how far can we, the power companies, go to adapt our facilities to the requirements of the new system?

Size, form, and lack of interchangeability of units presents another problem. Mazda Fluorescent lamps are straight tubes of 1-1½-in. diam. and varying length. At present there are five sizes.

The Cooper-Hewitt fluorescent, while similar in design to the Mazda fluorescent, is much larger in both wattage and lumen output, and while it is a little longer than the 40-watt Mazda fluorescent it is only 1¼ in. in diam. There is only the one size.

Hot-cathode Zeon units may be built to varying sizes and in general do not have to conform to definite physical dimensions. The tubes are smaller in diameter and of much greater length, generally, and operate on voltages of 600 to 2,500. For decorative work, or for the illumination of large areas these tubes may be made to conform to the decorative scheme but for individual units the tubing is bent back and forth upon itself in order to secure as concentrated a light source as is reasonably possible. The transformer is mounted in the fixture housing.

A unit which is somewhat standardized in the Portland territory, at least, is constructed of 25 mm. tubing about 17½-in. long. It is 350 watts, operates at approximately 1,400 volts. Its power factor uncorrected is 50%; but it usually has capacitor correction which brings its power factor up to about 85%. Its lumen output is given as 15,750, which is about 45 lumens per watt.

Cold-cathode fluorescent tubing is built by many different shops. At present, it is believed there is no standard size. However, a unit having some measure of acceptance in the Portland territory is rated at 95 watts uncorrected and 115 watts with capacitor. Size and length are somewhat similar to the above, but voltage is higher, in this case about 5,000 volts. These data cannot be considered altogether authentic, however.

There seems to be a general impression that the brightness of fluorescent tubes is low enough to be tolerable. But, as is evident in Fig. 1, this is not the case.

Furthermore, there is no magical power given to the fluorescent whereby lower levels of illumination are any more acceptable to the human eye than they would be if produced by the incandescent lamp. Installations cannot therefore be properly based upon a lower standard as is frequently recommended by amateur specialists.

In studying any comparison between the two systems, we must, therefore, start from the premise that in either case the light source must be concealed from direct view and that desirable levels of illumination are the same in either case.

Table II compares principal types of white fluorescent with typical incandescent units. So that all might be on a comparable basis, a branch circuit of No. 14 conductors, supplied with 120 volts and carrying 10 amp. was used.

The customer is interested in the number of lumens of light delivered per circuit of capacity provided by his wiring installation.

From Table II and Fig. 2, the customer can readily see that units with power-factor correction provide him with a great deal more light than the uncorrected units, and do so without requiring any change in his wiring.

It would appear from this that the additional cost of providing power-factor-corrected units is less than the additional cost of providing more copper capacity. No attempt has been made to show a direct cost comparison between the two methods of providing the required lumens, but the engineer can readily do this for his customer by applying costs to the customer's specific case.

Table II also shows that the power-factor-corrected units in every case but one provide a power factor of 90% or better, but in no case does this correction reach 100%.

From a study made in the East, it is indicated that the maximum correction attainable by the use of condensers across the circuit for individual units lies between approximately 93% and 97%. But for tulamp correction these limitations do not hold.

High-power-factor, single-lamp ballasts are already on the market—a further endeavor by manufacturers to solve this power-factor problem.

To minimize wiring difficulties, auxiliaries should be placed as close as possible to the tubes they control, and, in order to obtain the advantage of power-factor correction for the customer's wiring system, capacitors should also be adjacent to the tubes. The manufacturers are answering these problems by the development of self-contained units, designed to be installed within the lighting fixture itself.

A further problem is presented by the surge voltages due to the momentary interruptions of the ballast choke coil during the starting of the fluorescent tubes. These surge voltages apparently range from 700 to 1,300 or 1,400 volts for the thermal auxiliary. Wiring must be designed accordingly.

A major objection to fluorescent lighting is the stroboscopic action or "cyclic flicker." This may be minimized by the use of three-phase service with individual tubes mounted close together and connected to the different phases. However, this is not a satisfactory solution from the standpoint of either the customer or the central station.

Recently the development of the Tulamp ballast has produced a marked improvement in the cyclic flicker problem. This requires the use of two tubes of the same size mounted close to each other, one of which is connected in series with a condenser and choke coil and the other in series with a choke coil only. In this manner the two are thrown out of phase with each other causing an overlapping of the light pulsations and a marked reduction in flicker at distances from the luminaire sufficient to permit of the proper mixture of the light from the two tubes. At the same time the tulamp ballast raises the power factor of the combined unit to 95% or better.

Not all the headaches produced by the sudden growth of fluorescent lighting are felt by the central station group. The manufacturers need their quota of aspirin too, and the standard manufacturers are to be commended for the way in which they are endeavoring to place high-grade fluorescent equipment on the market.

Two standardizing organizations are working to control the quality of fluorescent luminaires by placing a stamp of approval upon the product of manufacturers whose output complies with the rigid specifications established by the industry as necessary to produce a satisfactory unit for the ultimate user. The standard commercial luminaires are manufactured under the Fleur-o-lier specifications and certified by the Electrical Testing Laboratories. The standard industrial line of fixtures is manufactured under the well known R.L.M. standard of requirements.

Except for these two excellent certifications, there are no well known standards for fluorescent luminaires. The power companies can save themselves much worry by recommending only the equipment certified by these.

It is quite evident that the worries of of the electric utilities will not come from the major manufacturers who will abide by the above standard but from the myriad unorthodox manufacturers who are largely non-conformists and who are eager to cash in on the wave of popular fancy. The utilities must take steps to protect themselves from the improper developments. Fortunately, the start already has been made.

Likewise, utilities must protect themselves from poor power factor. For they can't afford to carry large blocks of wattless energy without proper compensation.

The following reports relative to enforcement of power factor corrective equipment by utilities are believed to be essentially correct:

Puget Sound Power & Light Co., (effective 3/1/40) utility ruling requiring not less than 90% power factor.

City Light, Seattle, (effective 3/1/40) utility ruling requiring not less than 90% power factor.

Northwestern Electric Co., (effective 3/25/40) ruling filed with Public Service Commissioner requiring 90% P.F.

Portland General Electric Co., (effective 3/25/40) ruling filed with Public Service Commissioner requiring 90% P.F.

Pacific Gas & Electric Co., (effective 12/28/38) filed ruling permitting 90% P.F. requirement now enforced.*

Bureau of Power & Light, Los Angeles, (effective 7/1/39) rule permitting a 90% P.F. requirement now being enforced.

Southern California Edison Co., (effective 1/3/39) filed ruling permitting 90% P.F. requirement now being enforced.*

San Diego Consolidated Gas & Electric Co., (effective 4/15/39) filed rulings permitting 90% P.F. requirement now being enforced.*

It is also understood that the municipal utilities of Riverside, Glendale and Burbank, California are considering the establishment and enforcement of similar rules on a uniform basis of power factor requirements.

If all utilties and small, public and private, would join in uniform enforcement of a provision such as that in the footnote, little difficulty would be experienced by anyone. And every one would benefit—the customer, the utility, the contractor and the manufacturer.

Without exception the minimum requirement is 90%. Likewise, almost all corrective equipment is based upon improving power factor to 90% or better. This indicates that manufacturers and utilities are working toward a common end.

In order that this 90% standard be maintained, it is essential that contact with all customers be maintained by each utility. For unscrupulous or uninformed salesmen will always be trying to evade the rules.

This new light source makes it more important than ever that installations be designed by technically trained men. There will be plenty of novices who will attempt to give advice, and unless each utility maintains a competent department to assist its customers, both the public and the utility will suffer.

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* The expression "filed ruling" refers to rules filed with the Railroad Commission of California and are similar to the following rule filed by the San Diego Consolidated Gas & Electric Co.:

"Power Factor Correction: In the case of neon lamps, mercury vapor lamps, welding transformers and other gaseous tube lamps or devices having low power factors, served on general service schedules, the Company *may* require the customer to provide at his own expense, power factor corrective equipment to increase the power factor of any such devices to not less than 90%."

Utilization Committee—Devices*

Water Heater Tank Performance

By C. S. ALGER
Puget Sound Power & Light Co.

OF all labor-saving electrical devices displayed today the storage water heater is perhaps least satisfying to the soul of a gadget-loving public. It is difficult for the average prospect to reconcile the not inconsiderable purchase price of these heaters with the apparent simplicity of the device which has no visible moving parts, no functions which may be watched or regulated, or no other distinctive features which may be demonstrated for the pleasure of the purchaser and envy of his friends. Since he naturally expects the same measure of satisfaction from a water heater as from other electrical appliances, this lack of appeal must be replaced by other salient points, chief of which, aside from adequate hot water service, is long trouble-free life.

Ensuring such life involves careful consideration of the conditions under which the electric heater must operate, particularly the storage tank. Since the water-heater load is highly desirable to most serving companies, and since its growth is predicated on customer satisfaction, it remains for these companies to lead the way in the selection of tanks best suited to give long life under local conditions. This has been difficult to do because of the variety of conditions encountered, and increasing pressure has been brought to bear on heater manufacturers to supply tanks which can be safely installed under almost any conditions and yet be sold at a price the customer is willing to pay. As a result there have been several relatively new developments embodying new materials or protective coatings and advanced methods of fabrication.

It was the original purpose of this discussion to describe briefly the various tanks available and to attempt to weigh the merits of each as indicated by replies to a questionnaire on the subject circularized among member companies. Except for a few cases, data obtained in this manner were not very helpful, probably due to the inadequacy of the questions advanced and also to lack of authentic records of tank performance. Lacking field data, it has been necessary to predicate these remarks largely on theoretical conclusions, using performance records only where representative and sufficiently complete.

Galvanized-Steel Tanks

The galvanized-steel tank is fabricated from range-boiler-quality steel plate which has a small percentage of added copper to improve rolling and galvanizing qualities but contains less than the 2% usually found in the so-called copper bearing steel. Tanks are available in welded or welded-and-riveted form and are classed, according to wall thickness, as standard, extra heavy and double extra heavy. The additional wall thickness in the latter tank is utilized as a means of prolonging tank life from the standpoint of corrosion, rather than the needed mechanical strength. Eleven-gage plate is used in the walls of the 30- and 40-gal. extra heavy tanks with 10-gage heads. A similar 50-gal. tank has 10-gage walls and 3/16-in. heads.

After fabrication by either of the above methods the tank is thoroughly pickled and hot-dip galvanized. In this process a zinc coating approximately 0.005 in. thick is retained, amounting to about 3 oz. of zinc per square foot of surface covered. Fittings, which are welded in place before galvanizing, are machine threaded after this process is complete, and the tank is then tested with air under water. Tanks proving defective are stripped, re-welded and re-galvanized.

Before passing to the observed performance of galvanized tanks a word should be said about corrosion, which is the main reason for considering tanks other than steel for electric water heaters.

As the result of experience and from a variety of experimental and theoretical data on the subject, it is apparent that the rate of corrosion of galvanized-steel tanks depends on a number of factors, the most important of which are: available oxygen, water temperature, quantity of water heated and temporary hardness.

The galvanizing process gives mechanical and chemical protection to the steel for a short period. Chemically the higher solution pressure of the zinc protects the iron even where very small areas are actually exposed, but unfortunately the zinc corrodes rather rapidly, as was demonstrated by experiments conducted by G. E. Cox at the Massachusetts Institute of Technology. In these experiments the highest rate of corrosion of pure zinc in aerated distilled water occurred between 150°-160°F., which is the approximate temperature at which a majority of water heaters are operated. Since oxygen is available in varying amounts in most natural waters and is continually supplied as the result of hot-water use, this action can go forward in the electric heater with a speed proportionate to the amount of oxygen available.

As the zinc is dissolved general rusting of the steel takes place, but such action may be preceded or accompanied by the formation of blisters and nodules under which deep cups and pits develop in the steel. These finally penetrate the tank wall. The cause of these localized areas of extreme activity is variously attributed to galvanic action due to inequalities in the composition of the metal, or to the formation of metal-ion concentration cells, or differential-oxygen concentration cells on the surface of the metal. These concentration cells result when differences in metal-ion or oxygen concentration are established at close quarters by relatively confined and unconfined bodies of solution, differences in flow velocity, or differences in the supply of dissolved air.

It has also been found that stresses in metals tend to accelerate corrosion, (McAdam) and since there are factors in the fabrication and operation of steel tanks which introduce such stresses these may be contributory causes of localized corrosion.

These processes, directly or indirectly, require the presence of oxygen, which becomes more readily available as the result of heating and in quantities increasing with the amount of new water admitted to the tank.

It is well known that in certain areas galvanized tanks have an exceedingly short life, the probable reasons for which have been discussed, while in other areas they have given service for many years. Long tank life is in all probability due to the deposition of temporary hardness as the equilibrium of the solution is disturbed by heating and pressure changes. This temporary hardness is usually in the form of carbonates and, if present to the extent of 70 parts per million or more, has been shown experimentally to deposit a protective scale which prevents corrosion.

There is also another factor which may contribute to long life in the steel tank. In the experiments conducted at MIT, mentioned above, it was found that the film produced by the corrosion products of zinc had characteristics varying with the sustained temperature. Up to 120°F., and from 200°F.

*J. E. Yates, Pacific Power & Light Co., chairman; B. C. Electric Railway Co., E. E. Walker; The California Oregon Power Co., R. S. Daniels; Eastern Oregon Light & Power Co., O. D. Lanning; Idaho Power Co., O. C. Mayer; Mountain States Power Co., G. McClellan; Northwestern Electric Co., Corbett McLean; Portland General Electric Co., A. H. Greisser; Puget Sound Power & Light Co., C. S. Alger; Utah Power & Light Co., A. C. Kelm; The Washington Water Power Co., H. C. Bender; West Coast Power Co., Henry Berk.

and above, the corrosion products film was of a nature which definitely adhered to and protected the under surface, indicating that galvanized steel tanks operated consistently at relatively high or low temperatures should have a longer life than those operated consistently at the usual thermostat settings for electric heaters.

The reports of field experience with galvanized tanks covered about 18,000 installations, in which the majority of the tanks had been in service appreciably less than ten years and none more than ten years. The number of failures due to corrosion for 1939 was reported as 78. This figure appears abnormally low for the number of tanks in service, which number it is believed may also include many installations wherein failures would not come to the attention of the utility. These would probably be the older installations and those made by dealers. The manufacturers expect an average life of from eight to ten years from galvanized tanks, although there are areas in Washington alone where galvanized tanks disintegrate in two to three years. However, it is to be expected that fewer galvanized tanks would be sold in such areas.

The number of failures reported as resulting from manufacturing defects or developed mechanical conditions was negligible, indicating that the art of manufacturing has reached a high state of perfection.

Porcelain-Lined Tanks

In the early stages of the development of storage water heaters the manufacturers offered heaters equipped with non-ferrous tanks which were suitable for practically all conditions of operation. These heaters necessarily commanded a high price, and recognizing the importance of this factor in volume sales of water heaters, a Northwest manufacturer developed porcelain or glass lined tanks for his product, which could be marketed for considerably less than heaters equipped with non-ferrous tanks.

The idea of a glass-lined tank is not new, having been tried in Europe where it apparently was not entirely satisfactory because of the inability of the lining to follow the breathing action of the tank and the sharp temperature changes occurring with the influx of cold water. Little is known of the European practice and the early experience there does not necessarily reflect on the product produced in this country.

"Armco" enameling iron is used in the construction of the locally made lined tanks, the 30-, 40- and 50-gal. sizes having 12-gage walls and 10-gage heads. The gage of metal is somewhat lighter than that used in steel tanks on the assumption that, should the protective coating fail, the iron will not be subject to the pitting found in the steel tank.

The manufacturing process consists of rolling and electrically butt welding the wall section, butt welding to the wall a dished and flanged head and applying a welding fillet at the juncture of the dished head and side wall after inserting the head. Drop-forged fittings are welded in place at the tank openings, Paige F2 welding rod being used for all operations. After fabrication and before the lining is applied the tank is tested at 300 lb. hydrostatic pressure. This is followed by covering the interior with frit for the ground coat, which is accomplished by tumbling the tank with a quantity of the material in liquid state inside and removing the surplus. This coat is baked for 12 min. at 1,560°F. and is followed by the second and last coat, which is baked at 1,530°F. for 10 min.

Porcelain lined tanks have been in service for about five years. During that time failures have occurred, but apparently to no greater extent than might be expected with the exposure of a new development to the many rigorous conditions encountered in field operation.

The reports of two companies having a large number of tanks of this variety on their lines indicate that replacements for 1939 were approximately 0.5%, based on the number of such tanks in service. This figure disregards replacements of tanks manufactured in the very early months of production which, if included, would not give a true reflection of the performance of tanks now in service.

In view of the relatively short time these tanks have been in service and concurrent developments in the art of manufacture, it is not possible at this time to form definite conclusions regarding their life as compared to that of other types. Questions regarding the general mechanical durability of the tank, effect of temperature and pressure changes on the lining, solubility of the lining and possibility of corrosion of the iron, as discussed above, still remain to be fully answered. It should be possible to produce a glaze which will not readily dissolve and perhaps one which will withstand normal changes in water temperature and pressure. If this proves to be the case with the improved glaze now being used, there should be little cause for apprehension regarding corrosion of the iron.

Working with the largest manufacturer of glass-lined pipe and non-pressure vessels, one of the foremost water heater manufacturers is equipping a number of water heater with glass-lined tanks for field trial. It is expected that these trials may consume the better part of two years. Very little definite information is available concerning these tanks, but is understood they are lined inside and out, the wall and heads being separately treated before assembly. The exact method of assembling these parts is not known, although it is understood that a welding process is employed. This development will undoubtedly be watched with considerable interest.

Copper Tanks

Probably the earliest effort to produce a non-ferrous pressure vessel was the handmade copper tank. Such tanks have been in service for nearly a century. They were and are today largely handmade by skilled coppersmiths, using methods of construction and weights of material peculiar to the gradual development of a particular design.

The design and construction of non-ferrous tanks, particularly those of copper, is necessarily based on attaining definite performance characteristics, since no formula can take into account the skill of the craftsman in working the copper to the required shape and hardness after it has been annealed in the process of fabrication. Recognizing this fact, the non-ferrous tank manufacturers are now engaged in the preparation of a code of performance characteristics for such tanks.

It is doubtful whether copper tanks have been used to any extent in electric water heaters, although a few were reported in service in 1939. These may have been confused with the Everdur variety, but in any event were reported satisfactory both mechanically and from the standpoint of corrosion.

Everdur Tanks

The number of Everdur tanks reported in service was extremely limited, and although some heater manufacturers have used such tanks extensively no data on performance were obtained. Everdur, a silicon-manganese copper alloy containing 96% copper, was patented in 1925 by Charles B. Jacobs. It has nearly twice the strength of copper, with equal or better corrosion resistance, and is easily handled with modern welding methods. This material naturally found favor with tank manufacturers since the fabricating process is a relatively simple one, comparable to the construction of a steel tank and a similar design may be employed.

Based on data published by American Brass Co., the average wall thickness required for 300-lb. test, 30-, 40- and 50-gal. tanks is roughly 35% less than that used in similar steel tanks.

Head thickness is approximately the same where pressure is on the concave surface, while greater thickness is recommended when pressure is on a convex surface, as in the bottom head, the latter being a refinement which the steel tank manufacturers do not usually recognize.

Monel Tanks

The physical properties and corrosion resisting qualities of Monel are well known and need no discussion here. The manufacturer guarantees tanks of this material for 20 years against corrosion, and tanks in service for the past five years have shown no evidence of corrosive action.

The general construction of the Monel tank may be of some interest to those not already familiar with it, since the design and construction methods were developed especially to utilize to best advantage the properties of relatively thin Monel sheet.

For example, the 14 x 60-in., 40 gallon, 300-lb.-test tank has a wall thickness of 0.047 in. and a head thickness of 0.037 in. backed by 3/16-in. steel plate. The wall is reinforced against collapse by three channel-shaped rings, evenly spaced throughout the inside length of the tank. In fabrication specially rolled sheet is punched for tank openings, rolled to cylindrical form and held in shape by spot-welding a lap joint. This joint is then resistance welded throughout its entire length, during which time the weld is cooled with water to prevent extensive annealing. The inner side of the completed joint is then covered with a soft solder fillet intended to stiffen the seam and eliminate any possibility of minute leaks. Brass fittings are mounted in the shell openings with silver solder, ingeniously applied, in the form of a thin washer placed under the part of the fitting where it meets the shell. Both heads are concave as viewed from the outside. The head assembly, consisting of Monel liner and steel backing, are slipped into the end of the shell, being so proportioned that with the edges of the liner and tank wall flush, the cylindrical rim of the steel liner is well within the cylinder. The assembly is then welded in place and the extension of the liner and tank wall rolled so as to make a return bend over the edge of the steel liner. Before the heads are installed the threaded portion of the end opening fittings is silver soldered to the Monel liner and fastened to the steel backing by a nut on the outside. Following these operations a soft solder fillet is applied at the joint of the head liner with the inside wall of the tank. This fillet is also intended to give added strength and eliminate possibility of small leaks. Finally the tank is tested at 300 lb. hydrostatic pressure.

Only one company reporting, excluding the Canadian company whose Monel tanks are manufactured in Canada, had an appreciable number of these tanks in service. Performance data and conclusions are, therefore, based on these tanks, which number about 6,500.

During 1939 there were approximately 35 tanks failures, or roughly 0.5%, based on the number of tanks in service. These were all due to manufacturing defects or developed mechanical failures. Fifty per cent of these occurred at the cold water intake fitting, appearing as small leaks in the brazed joint. In five cases leaks developed at the heater openings, four of which were in tanks of early design in which the fitting was made tight with soft solder. The fifth was due to imperfect brazing of the fitting to the tank. Seven failures were due to cracks developing at the lap-weld in the tank wall. Information on the remainder is not complete.

The Monel tank is comparatively new and it is to be expected that certain weaknesses might develop under field conditions. The chief of these, which have been described, have occurred to about the same extent in other areas. In consequence, International Nickel Co. has conducted extensive studies at MIT, and in their own laboratories on tank behavior under a variety of operating conditions, with the result that three important modifications have been made. The use of soft solder for attaching opening fittings has been discarded in favor of silver solder. It is believed that recent changes in the method of making the lap weld in the wall will eliminate cracking adjacent to the main weld, which was caused by annealing of the metal at that point and aggravated by stresses occasioned by an offset in the overlapping member. This offset is no longer used and the joint is spot-welded on each side of the main weld to relieve it of undue stress. The last improvement was made in the shape of the fittings used at tank openings. These are now shaped to fit the contour of the tank at the point of application. While this requires costly machining of the fittings it reduces stresses in the assembly to the minimum obtainable.

It will be some time before it is definitely known whether these modifications are fully effective but numerous tests by the manufacturer indicate that they will reduce the number of failures to a negligible quantity.

Copper-Clad Steel Tanks

At least two concerns experimented with the production of steel tanks having non-ferrous liners. This construction was costly, and although some sales were made the idea was discarded in favor of solid non-ferrous tanks or those built with Copper-Clad steel.

Less than two years ago, Republic Steel Corp. began the manufacture of Copper-Clad steel plate and sheets, using for this purpose Everdur or a very similar alloy. A Seattle tank manufacturer immediately saw the possibilities of this material and was largely responsible for the development of suitable processes for the manufacture of welded tanks at a cost appreciably below that of the non-ferrous variety.

In the production of this material a slab of steel 3 to 4-in. thick and weighing about 3,000 lb. is pickled and sand blasted, and a strip of steel is welded around the edges of the slab to form a basin. This slab is then heated to a temperature nearly equal to the melting temperature of copper silicon bronze. After covering the slab with borax flux molten alloy is poured into the basin in such quantity that the thickness ratio is 0.2 to 1 of steel. The slab is then removed from the furnace, rolled to the desired thickness and trimmed to specified dimensions. The relative thickness of alloy to steel remains the same during rolling.

Copper-Clad can be bent, stamped and drawn as readily as the steel base and can be worked hot up to 1,650°F.

In the manufacture of tanks the welding process is the most important and most difficult to handle. To make the protective copper coating continuous the steel showing at lap joints must be entirely covered by welding with alloy rod. Careless welding, which permits the burning off of the copper layers or failure to chip off steel needles which run through the joint before completing the weld with alloy rod (if ferrous welding rod is used on outside), offset to some extent the advantages of copper-cladding the steel. However, carefully handled, Copper-Clad can be properly welded by both gas and electric arc methods by using either a copper silicon bronze welding rod for the clad side and a steel weld for the steel side, or by welding both sides with a silicon bronze rod by means of an electric arc, as is done locally.

The present approved method of construction is to lap-weld the longitudinal seam and one head joint and then weld an alloy bead internally on the edges of the exposed steel of these two joints. The second head being reversed and having an external joint presents no internal raw steel edge. In some tanks both heads are reversed, but tank capacity is reduced. Everdur fittings are welded into the tank openings with alloy rod. Fourteen-gage sheet is used in the walls of the 30- and 40-gal. 300-lb. test tanks and 12-gage in the 50-gal. size. All heads are 10-gage.

Copper-Clad tanks are now manufactured by eight concerns in this country.

However, it has so far been the easiest way of finishing the outside of the tank and provides sufficient protection to eliminate the need of crating for shipment.

This type of tank appears to have considerable merit, although only six were reported as being placed in servive by member companies. No failures were reported but the number is too small and the length of service too short for any conclusions to be reached. Actually, about 1,000 of these tanks have been sold in the Northwest, according to the local manufacturer. A 20-year guarantee is offered by all concerns manufacturing tanks of this material.

This discussion would not be complete without some reference to the relative costs. For this purpose an effort was made to obtain comparable retail prices for 30-, 40- and 50-gal. range boilers of the various types. It was felt that such prices would be more relevant than estimated prices for special electric heater tanks. Some difficulties were encountered, owing to the fact that the copper and Everdur tanks are no longer listed locally, having been displaced by the Copper-Clad tank. However, Table I gives a fair indication of the price range; the prices of porcelain lined range boilers are estimated by the manufacturer since these tanks are only regularly produced for use in electric heaters.

It will be noted that the porcelain lined tank occupies an enviable position with regard to price. It is also probable that increasing production will result in lower prices for Copper-Clad tanks with the result that one or the other will prove to be the ideal tank for which the industry has been searching. Both, however, are lacking in performance records of sufficient duration to prove superiority in other respects. Such records can only become available through the continued efforts of those who recognize the need for developing the water heating load on a basis of complete customer satisfaction.

Table I—Retail Prices of Range Boilers

Type of Tank	Test Pressure	30 Gal.	40 Gal.	50 Gal.
Galvanized Steel	300 lbs.	$ 9.20	$12.40	$26.92
Porcelain Lined	300 lbs.	15.65	21.10	45.70
Monel	300 lbs.	53.15	71.20	96.00
Copper-Clad	250 lbs.	37.85	51.00	68.75

Efficiencies of New Appliances Cut Use

By CORBETT McLEAN
Northwestern Electric Co.

MODERNIZATION of appliances has been a decided aid in the sale of equipment for load building. However, the expected increase in power consumption due to increased saturation has been appreciably reduced because of increased operating efficiency and customer training.

One manufacturer reports that it reduced the monthly consumption of its 4- to 5-cu.ft. refrigerator from 50 to 17 kw.-hr. per month and increased the capacity from 245 to 500 B.t.u. per hr. from 1929 to 1940. Consumption of the 6- to 7-cu.ft. unit dropped from 55 to 23, output increased from 340 to 560 in a like period.

This company has also stated that the consumption of its electric ranges has been reduced 25% to 50% in the last 10 years because of improvement in units and methods used. The oven preheats in half the time, and the surface units have almost twice the efficiency with a reduction of one half in the time to heat water. In the last six years, average consumption has been reduced from 145 to 100 kw.-hr. per month, or over 30%. In 1937 the 1,300-watt small surface unit boiled a quart of water in 8.8 min. with an efficiency of 54.3%. In 1939, the same size unit boiled a quart of water in 7.6 min. with an efficiency of 67.3%. In 1940, the 1,250-watt unit performed the same task in 7.5 min. with an efficiency of 70.5%.

Table I (Edison Electric Institute) shows estimated annual consumption of various appliances and the 1939 saturation. To this has been added the saturation of the Portland residential customers of Northwestern Electric Co. as determined by an actual field check of 80% of its customers in that area.

Table I shows that with 100% saturation, one customer would have used 5,695 kw.-hr. in 1936, but only 4,475 in 1939—a loss in annual consumption of 1,220 kw.-hr.

Other calculations from the data in Table I are also shown in Table II.

The above figures are based on averages and are accurate only to the limits which can be procured by the use of such a method. It is also probable that the consumption per appliance in the northwest varies considerably from the national average. However, the figures are indicative of a loss in revenue which is important enough to occasion a great deal of thought.

Continued improvement in operating efficiency and extension of customer training are both inevitable and desirable. However, they compel the development of new equipment and the increase in versatility of appliances already on the market to retain and amplify the present revenue.

Table I—Appliance Use and Saturations

	Annual Use (EEI) (Kw.-hr. per yr.)		Saturation, 1939 (%)	
	1936	1939	EEI	NW Elec.*
Refrigerator	480	356	57	54.2
Water Heater	3000	2500	3	6.8
Range	1500	1020	9	37.0
Radio and Phonograph	100	80	100	107.7
Flat Iron	80	64	101	97.5
Oil Burner	225	237½	7	14.0
Washing Machine	30	24	49	69.2
Vacuum Cleaner	24	20	49	70.7
Toaster	30	15	52	78.9
Percolator	36	25	30	37.4
Electric Clock	15	14	52	54.6
Ironer	125	100	6	10.0
Space Heater	50	20	21	9.3

* Portland dwellings.

Table II—Appliance Data for Actual 1939 Saturations

REFRIGERATORS, RANGES, AND WATER HEATERS

	EEI (National) Annual	N W Elec. (Portland-dwellings) Annual
Average 1939 consumption (kw.-hr.)	890	1721
Average cost to consumer	$36.05	$42.34
Loss in consumption (kw.-hr.)	129	279
Probable consumption if efficiencies had remained constant (kw.-hr.)	1019	2000
Average cost to consumer	$39.90	$47.20
Average loss in revenue account of modernization	$3.85	$4.86
ALL APPLIANCES IN TABLE I		
Loss in consumption (kw.-hr.)	188	343
Probable consumption if efficiencies had remained constant (kw.-hr.)	1078	2064
Average cost to consumer	$41.40	$48.50
Average loss in revenue account of modernization	$5.35	$6.16

Discussion

PAUL L. MARBLE: The industry faced somewhat the same situation in 1913 with the advent of the tungsten filament lamp, which greatly increased efficiency over the former carbon lamps. The problem is to advertise these modern appliances as giving more service for less and through advertising and sales to put more of them on the lines.

M. F. HATCH (in answer to question concerning the increase in the demand of range load due to larger connected loads of the new ranges): Individual demands of range customers have increased but the diversified demand of a group of customers (10 to or more) has not shown much change.

O. L. LEFEVER (in answer to the question, "Have any companies experienced reduction in residential load?"): There has been no loss of residential load. It appears that the customer will pay about the same bill each month. He will increase his use with increased efficiency of his appliances.

J. E. YATES: Increased appliance efficiency has made it possible to sell more of these appliances to low use customers so as to bring up the average use despite the increase in efficiency. Therefore we should not fear these better appliances.

Farm Freezing Plant

By HOMER J. DANA
Engineering Experiment Station
Washington State College

A FARM freezing plant was first designed in the State College of Washington in July 1937 and subsequently improved in 1938, in cooperation with Roscoe Cox, a successful farmer near Pullman.

One plant constructed by the college had a 0° room 2 ft. 6 in. wide by 5 ft. long by 5 ft. 4 in. high, and a 35° room 5 x 6 ft. by 6 ft. 6 in. high. The 0° room was built inside the 35° room. Insulation was 12 in. of medium packed planer shavings on all four sides and roof of the 35° room with additional insulation around the 0° room. In two different designs, the 0° room was built first with a top door and second with a side door. A ½-hp. air cooled freon condensing unit was found adequate to carry the heat load of the Cox plant.

The device is fully explained in Engineering Bulletin Series No. 59 of the Engineering Experiment Station, State College of Washington, May 1939, entitled "The Farm Freezing Plant and How to Use It."

Discussion

(The question was raised, "Will this freeze planting on individual farms cut into the frozen locker business in the cities and small towns?")

H. J. DANA: I do not believe so. The cost of such an individual plant is about $375 for the material, and this cost will give it a rather limited market. Actually, the use of this device on some farms might stimulate the interest of others in the central locker system in which individuals may rent their own lockers by the year and thus avoid having a large investment in their own plant.

Power Production Committee*

Welding Water Wheels

By E. A. WOODHEAD
Idaho Power Co.

Following are comments on our experience with welding and metallizing various metals, with particular reference to runner repairs.

Bronze

Repairing bronze parts is more difficult than repairing cast-iron, cast-steel or plate steel parts because of the composition of the alloy. Furthermore, bronze blades are usually smaller in dimension and the spaces or waterways are more restricted. It is particularly difficult to weld bronze successfully when the work cannot be placed in position for application of the new metal, as is the case almost always when service does not permit sufficient outage for a dismantling operation.

A desirable and high-class job of welding over pitted areas in bronze is accomplished when machines are taken from service and dismantled permitting the damaged surfaces to be so placed that the metal can be flowed in its molten state as on a horizontal plane. On the other hand, it is extremely dificult to place the surfaces in the right planes for successful welding when dismantling is possible.

It has so far, in our experience, been impossible to accomplish a satisfactory electric-arc bronze welding job without dismantling to the extent of removing runners. Therefore, our bronze welding has been done by oxy-acetylene process.

For a while it was our practice to use low-strength tobin bronze rod which had a comparatively low fusing point. At the same time we carried on experiments with various welding rods to find one which flowed freely enough to form a homogeneous weld and at the same time offer greater resistance to cavitation. At present we are using waterwheel bronze runners and are repairing pitted areas with manganese-bronze welding rod.

The bronze welding rod should contain no aluminum in order that proper fusion take place at lowest temperature. The lead content should be down so as to avoid a porous or spongy result. It is important also that drafts of air during the cooling process be avoided.

Cast Iron

At present, cast-iron surfaces are being welded on our system by first applying a coverage of mild steel, placed in the normal manner. On this we now apply a thin coat of stainless steel, usually 18% chrome, 8% nickel. Thus the bonding is accomplished between the hard and tight chrome-nickel surface to the softer cast iron through a blanket of mild steel through which the stresses can be distributed with less separation between the new metal and the parent metal. Where the tendency to cavitation is less severe, the bringing of the surfaces back to normal by the application of successive beads is less necessary and to some extent less desirable because we have not subjected the bond between the parent metal and the new metal to the added stresses injected at each application. It is therefore very desirable not to permit the pitting to proceed longer than is necessary to indicate the maximum outline over which the surfaces will eventually have to be protected.

Cast Steel

Pitting on cast steel is now being covered in nearly all cases at an early stage with stainless steel applied direct to the parent metal by electric arc.

*E. H. Collins, The Washington Water Power Co., chairman; B. C. Electric Railway Co., E. E. Carpenter; The California Oregon Power Co., H. Olson, H. C. Wells; Idaho Power Co., H. L. Senger; Mountain States Power Co., G. McClellan; Northwestern Electric Co., O. L. LeFever; Pacific Power & Light Co., J. H. Siegfried, J. E. Yates; Portland General Electric Co., W. E. Briggs, O. B. Coldwell; Puget Sound Power & Light Co., A. P. Newberry, H. H. Waldorf; Utah Power & Light Co., B. E. Gordon, E. M. Naughton; The Washington Water Power Co., M. L. Blair, W. A. Hill, J. S. McNair.

On cast steel vanes where considerable pitting has been found at the end of the first year's service, the surfaces have been covered with one application of stainless steel without regard toward establishing normal contours but with an eye toward maintaining all new surfaces under the original lines. After two years of normal operation after the welding very little pitting has been found, the surfaces on some vanes not being attacked enough to obliterate the grinding tool marks made at the completion of the welding job. For a ceiling weld, less material is lost when a blanket of mild steel is placed on the parent metal first, the stainless steel being applied on the mild steel surface much more readily with less time and much less loss of rod.

Metalizing

A successful job of metalizing a complete turbine where two or more runners are involved, makes it necessary that this difficult operation be performed as many times as there are various patches or areas to be repaired. The secret of its successful application, as we have experienced, depends upon obtaining first the irregularities on the surface that are essential to a proper keying of the new thin metal surface, since the bond is purely mechanical. The preparation of the parent metal surface is accomplished by steel shot blasting and avoiding, before applying the molten blast, all oxidation at the surface. It is important that the application of the molten metal be at proper angles to surface, at the right distances and at proper air velocities. We have successfully metalized bronze runner vane surfaces, cast steel and plate steel seal rings where the water velocities and speeds were comparatively high. However, where the application has been satisfactory, it has been accomplished only by dismantling completely, and steel shot blasting the steel surfaces that could not be prepared with a tool in the lathe, shaper or planer.

On another entirely different turbine attempts were made to metallize bronze runners without dismantling and the process was in no way successful. This was attributed to the following:

The surfaces were prepared by sand blasting, not by steel shot blasting; there was too much moisture within the turbine chambers, caused by vapor from the draft tube and from a down blast of air from the penstock; there was insufficient preparation for carrying away dust.

The proper application of molten metal by the air blast process is, we find, accomplished more successfully when each surface to be repaired is carried through from the beginning to the end before starting repairs on adjacent vanes or other surfaces.

Incidentally considerable application of metallizing has been very successfully made on our system on pump shafts, turbine shafts, steel pins in gate assemblies, shaft surfaces under stuffing boxes, where it has been possible to place the work under a tool as in a lathe, shaper or planer where the proper undercut interlocking surface can be provided and the application of the molten surface made before any indication of oxidation has been possible.

Metalizing is being used to some extent to resist corrosion on flat surfaces as on steel tanks, structural steel, etc., where the softer metals—namely, lead, tin, zinc, cadmium and aluminum—give the best results. The harder metals such as stainless steel, monel, copper, bronze, etc., it is thought, would not be practicable for this purpose, because of the blanket thickness and the polish required making them prohibitive in cost.

Discussion

C. A. CRAWFORD (in answer to question): No. The Pelton Water Wheel Co. does not do metalizing. We have manufactured some turbines with mild steel and worked it down.

A. VILSTRUP: There is a contractor in Vancouver, B. C., who does this work.

(Other speakers brought out the fact that there are also such contractors in Spokane and in Portland. The outfit in Portland does not go outside the shop except on special occasions, and it does not guarantee its work outside the shop. The Metalizing Co. of America, Los Angeles, will go any where in the United States to do this work.)

Protective Coatings For Hydro Structures

By L. J. POSPISIL
Washington Water Power Co.

IN spite of great progress in chemical science during the last two or three decades, it must be admitted that no comparable advance has been made in saving our iron from attack and disintegration. It is true that alloys or iron resistant to corrosion are available commercially. But for economic reasons, they are out of the reckoning for such structures as we are now considering.

It is still hoped that some cheap ingredient or alloy, rendering iron resistant to rusting, will be found, or that some simple surface treatment will bring about this result. But pending such happy outcome, not on the horizon as yet, we shall have to continue to deal with palliatives and retardants that leave a lot to be desired.

It has long been known that rusting of the general run of mild steel, of which most engineering structures are made, may be prevented in one of two ways: by completely excluding water from the metal, or by creating a slightly alkaline condition surrounding the iron surface. The first is strictly a problem in waterproofing and has been the underlying principle in most of the attempts at protection.

Here again man encounters certain tendencies in nature that make his plans difficult and checkmate many of his clever schemes and efforts. The first is the general instability of nearly everything found on this earth, from the hardest and toughest granite. All substances tend to be affected by temperature, solvents or light radiations. These bring about changes which greatly alter and weaken the structure of the original material very often destroying the usefulness for which it was at first selected.

Another handicap is the fact that water is an almost universal solvent with some effect on nearly all substances when reckoning over a long period of time particularly when temperature changes and light effects or other agencies are also at work. The end result of this is that our waterproofing products are likely to have a limited life only, thus conforming to the almost universal experience in nature.

As a result of somewhat disappointing experience, probably not much different than what most systems can recall, Washington Water Power Co. began in 1926 to apply to its penstocks a bituminous enamel coating. This was applied hot and to a very appreciable thickness, averaging about ⅛ in. A detailed account of this procedure and experience up to that time was given before this Association by J. S. McNair in 1934.* As a preliminary, it dealt in considerable detail with the theory of steel corrosion and protection. Anyone confronted with the problem of steel penstock protection against corrosion may find it very much worthwhile to study what is set forth therein.

Almost 14 years have elapsed since the first penstocks at Little Falls were coated with this enamel and 6 since the last application was made to the penstock at Chelan. Periodic examinations since have shown that in penstocks where water velocities are not exceptionally high the coating is in excellent condition, seemingly a durable job in waterproofing that is keeping water and moisture away from the metal.

The Chelan penstock starts with a diameter of 14 ft. and is reduced by 6-in. steps to a diameter 12-ft. 6-in., where it divides into two 9-ft.-diam. branches. In order that the large annual

*Electrical West, June 1934.

storage in Chelan Lake be used up each year it is desirable and feasible to operate the two units in the Chelan Station with wide open gates, and the generators are able to carry continuously the maximum load which the turbines will develop.

Longitudinal joints are for the most part quadruple-riveted, double-butt-strap type. The circumferential joints are in part single outside plate and in part both inside and outside plates. Rivets vary in diameter from 5/8 to 1 3/8 in.

For reasons easily understood, thickest plates and maximum sized rivets are used at the lower end, where the head is high and the penstock diameter at a minimum. As a result the penstock interior surface is relatively rough particularly at the lower end where the water velocities are at the maximum.

In considering such velocities, we naturally think first of the average value that is made up by dividing the volume of water by the cross-sectional area while knowing that velocity at pipe center is considerably greater than at the face of the cylindrical wall. Just what the fronting and trailing edges of quite thick plates and large rivet heads do to the water in the nature of local eddies and whirls and what local pressures and impacts may result is not known. However, isolated or limited areas have been found where the enamel or coating has been swept or scoured off and may be found piled in a sort of mass on the lee or trailing side of the projecting obstructions.

To understand this behavior one should note that the enamel has properties similar to sealing wax, brittle at ordinary temperatures, quite fluid at certain high temperatures and that the brittleness or ease of fracture is manifested when the material is subjected to large and sudden forces.

When a heavy pressure is applied transversely to a stick of sealing wax it is likely to snap in two, but if this pressure be moderate and the time extensive the stick may be bent into a U. Ice behaves in almost the same way.

It is quite likely that this action is more pronounced at summer temperatures of water.

It will be recalled that before the hot enamel is applied to the metal surface the cleaned plate is first given a priming coat which is made up of the powdered enamel, or similar material, dispersed in a solvent making up a rather thin bituminous paint. Apparently the bend between the metal and primer is stronger than between the primer and enamel as on these areas where the enamel has been removed the primer remains and so far has been giving adequate protection as no rusting has been observed.

One word of caution: the necessity of a good bond, primer to metal and enamel to primer, with total absence of porosity or "holidays." If moisture can get to the metal, corrosion will start and continue under the film, which may thus become loosened and fail to give protection over large areas, even though a large part of the film has not been penetrated at all. The writer has been told of instances in holds of ships where the surface appearance of the coating was excellent but on closer examination was found non-adherent with extensive rusting of metal under it.

It is ventured as a good guess that most of those who have to deal with the maintenance of hydraulic structures of steel composition have acquired some familiarity with more recent coatings of a type that do not depend for their effectiveness as protectors of iron on complete imperviousness to water. One of these is said to contain an inhibiting agent which prevents the first union between the hydrogen ion and the iron even though some moisture be present. The product itself is in the nature of a grease, will not harden and may be applied to iron that may have a coating of adherent rust.

The material has lubricating properties as well and it is also claimed that the surface to which it is applied need not be absolutely dry. It is produced and marketed by a very reputable concern and has a background of experience extending over 20 years. Because of its non-drying qualities, it cannot be used where the parts coated with it have to be handled or have to withstand a considerable amount of abrasion. White this somewhat narrows the field in which it may be used, there is still a lot of room left for its application.

We started some cautious experimenting with it in a particular field about two years ago, have extended it since and now plan to make some further applications as opportunity is presented.

Another material has drying properties so it forms a hard film but the drying process is said to be caused by molecular change termed polymerization in which no elements are taken in or given off. It is clained that the vehicle will penetrate rust and form a bond with the metal beneath but it would seem that there must be some limit to the thickness of the rust scale than can be thus penetrated. It is claimed that while the polymerized dry film will absorb up to 4% of water this water is chemically inactive so the underlying metal is not attacked.

We have made some limited use of this product under very adverse conditions and though the indications so far are quite favorable the writer does not feel justified as yet in making any definite conclusions or deductions from this use.

It was the first intention of the writer to touch on other hydraulic structures of a power development such as headgates, sluice gates and trash racks, but this opens up a rather broad field in which practically all types of coatings have been tried.

Discussion

L. J. POSPISIL: (in answer to questions as to the use of "No-Oxid")—Our older manholes in streets had exposed steel rails supporting the roof. The steel was severely attacked. These have now been replaced by concrete roofs but they have been a good proving ground for protective coatings. We tried "No-Oxid" here and it seems to have promise.

O. L. LEFEVER: We have used crude oil on the inside of cold circulating pipes with good success.

R. S. DANIELS: Lots of good paint has been spoiled by putting it on damp surfaces.

E. A. WOODHEAD: A good application for "No-Oxid" is on submerged bolts and nuts. We surfaced them with "No-Oxid" before installing and then the nuts do not become frozen on and can be easily turned off.

J. S. MCNAIR: (in answer to a question about Biturine Enamel): Lack of bond between Biturine and the coated surface may be caused by the Biturine being applied too hot, or applying it on a damp surface. If it is put on at the right time and at the right temperature, you get a good bond.

Steam Production

JOHN HOOPER
Northwestern Electric Co.
Discussion Leader

Mr. Hooper opened this subject for discussion and called on John Bankus, Portland General Electric Co.

BANKUS: In the second half of last year we carried a heavy steam load, but toward the end of the year we began purchasing 10,000 kw. firm power from Bonneville plus some dump power. This contract will step up to 20,000 kw. firm this year. This will have a bearing on the operation of our steam plant and make it more of a stand-by plant.

We have one boiler equipped for hog fuel only. We will probably change this so it can be oil-fired. This will make it more efficient as a stand-by boiler and will speed up the time it can be brought onto the line.

A. VILSTRUP: Our steam plant in Vancouver is used for stand-by only. We had no output from it in 1939. We keep one boiler under pressure using electric heat, and this takes from 80 to 100 kw.

This introduces problems of boiler maintenance. We have to pay particular attention to the boiler water since idle boilers are more subject to corrosion. We use only pure city water.

G. M. TRIPP: In Victoria, we cooperate with the lumber industry for stand-by service. They have hog-fired and oil-fired boilers.

MR. HOOPER: We had an idle turbine for a few months. When we turned it on, we found we had bearing trouble. We put in a block of cast iron and then had trouble lubricating it. We finally lubricated it with white lead and oil.

We found a leakage on the third and sixth stage between the barrel and the diaphragm and repaired this by electric welding. The turbine has chrome iron blades and we have very little pitting.

J. F. SPEASE: A turbine shaft in Aberdeen became badly scored. They took the shaft to Seattle and had it built up by spraying on metal. This repair job is holding up well after two years.

Maintenance Schedules in Power Plants

E. H. COLLINS
Washington Water Power Co.
Discussion Leader

MR. COLLINS said, "Our companies have a real operating job to do now to increase efficiency. An important phase of efficient production is adequate maintenance and inspection to avoid costly shut downs. It is the purpose of this discussion to determine what the trend is among member companies as to periodic examination, testing and maintenance of bearings or other parts of turbines."

J. P. MEDLIN: We have trained maintenance men in The Montana Power Co. with a maintenance schedule laid out for a year. We work on water wheels every six months. We test the acidity of oil regularly. Periodic inspection pays.

E. A. WOODHEAD: In the Idaho Power Co. we have no periodic time schedule on maintenance. The operators keep a log and take a record of bearing temperatures. From this, they know when to take the machine out of service for inspection.

JOHN BANKUS: Our maintenance schedule in Portland General Electric Co. is determined by load and water conditions. When there is plenty of water to carry our load on hydro, we inspect our steam units. In the low water season, we do our maintenance on the hydro units.

R. S. DANIELS: In The California Oregon Power Co. we have no regular schedule for inspection, but we look at the runners of our verticle units and also the Kingsbury bearings frequently. We find the verticle units need more attention.

J. S. MCNAIR: We have a regular schedule in Washington Water Power Co. We find some machines need attention about every six months while others can go a year. We know which ones these are from experience.

A. VILSTRUP: B. C. Electric Railway Co. has a definite schedule for inspecting each part of the machine.

MR. COLLINS: I believe we will all find that we should set up a definite inspection and maintenance schedule as a means of avoiding serious and costly shut down, which will be more expensive than regular maintenance.

Electrical Equipment Committee*—Operation, Maintenance†

Better Meters and Periodic Tests

By K. G. FINLEY
Washington Water Power Co.

WITH the expiration of the Tesla patents in 1910 the meter manufacturing industry was thrown open to active competition with resulting improvements in design that have produced for us today a meter that is capable of accuracies comparable to secondary laboratory standards, and that is at least 15 years ahead of its maximum utilization in residential service. But the essentials of the meter today are no different than those of 40 years ago. This is particularly true when we confine our discussion to the sources of errors affecting the calibration of a meter over a period of time and as revealed by "as found" tests.

Errors contributing to the slowness of a meter are caused by an increase in friction over that present at the time of calibration. The primary sources of friction are the lower bearing, upper bearing, register and dirt lodging between the magnets and the disc, and dragging on the disc. Dirt may be of two sources—rust or scaling of paint and other foreign particles from the interior of the meter, and dirt from the outside. In addition there is the human element of proper cleaning and adjustment by the tester.

A questionnaire sent to Meter Committee members listed the above causes of slowness and asked their opinions as to the importance of each and whether they had been improved upon in the 400%-load meter. Ten replies were received. These have been evaluated below on a point system based upon the numerical order in which the causes were placed. For example, if some one cause was considered the most important by all reporting, that cause would have 10 points.

Causes of Slowness	Points
Lower bearing	21
Foreign particles from inside (rust, flaking paint, etc.)	27
Top bearing	35
Register	38
Dirt from outside	39
Improper cleaning and adjustment by tester	50

On the whole, the opinion was expressed that these features have been improved upon, though the opinions were not unanimous, and it was evident that more field experience is necessary. The purpose of this report was not to consider various types and makes of meters, but the grouping of all meters as used in the Northwest, and since the replies as to improvements were, in a number of cases, based on specific makes and types, no attempt will be made to tabulate these replies.

Fastness of a meter is generally caused by weakening of the magnets

*J. Hellenthal, Puget Sound Power & Light Co., chairman; O. L. LeFever, Northwestern Electric Co., vice-chairman; members-at-large: G. E. Quinan, Puget Sound Power & Light Co.; L. R. Gamble, The Washington Water Power Co.; and members of sub-committees on Apparatus and Design, Meters and Services, Systems Engineering, Operation and Maintenance.

†A. H. Kreul, Portland General Electric Co., chairman; B. C. Electric Railway Co., P. C. Gill; The California Oregon Power Co., H. L. Scovell; Eastern Oregon Light & Power Co., L. E. Wiggans; Idaho Power Co., J. F. Emery; The Montana Power Co., E. W. Williams; Northwestern Electric Co., L. H. Kistler; Pacific Power & Light Co., Ellis Van Atta; Puget Sound Power & Light Co., C. S. Alger; Sangamo Electric Co., T. S. Wood; Ntah Power & Light Co., J. H. Stayner; The Washington Water Power Co., K. C. Finley.

which in turn may be caused by normal aging, shorts and overloads and lightning surges. In addition, excessive light load compensation for abnormal friction that later clears itself—in other words, improper cleaning and adjusting by the tester may also contribute to "as found" fastness.

A questionnaire on this subject was also presented with the following results.

Causes of Fastness	Points
Normal aging of magnets	12
Weakening of magnets due to overloads and shorts	20
Improper cleaning and adjustment by tester	32
Weakening of magnets due to lightning	36

The opinions revealed more doubt as to improvement of this portion of the meter's characteristics. In general, however, the members believe magnets are improved, but have no data or information to support their beliefs. Probably the most correct summary of all opinions as to improvements affecting both the slowness and fastness is found in the following, expressed in one of the questionnaires:

"No special investigations have been made. However, it is our opinion that with the improvement in top and lower bearings, magnets, dust proof housing, overload and temperature characteristics, new type meters can be depended upon to maintain accuracy for a longer period of time than the older types."

It would therefore appear that any advantage of extending the test period that may be gained from improvements in watt-hour meters is largely a matter of opinion to be decided upon by the individual meter engineer. However, while no derogatory statements were solicited nor were any received concerning the improved meters, the writer is of the opinion that outdoor metering has added hazards that require more of the meter than the former more protected type of installation. One of these is the effect of high temperatures on the petroleum jelly used to lubricate the top bearing. The jelly works out under such conditions with two resulting effects—one of which is to run down on the worm or pinion gear, gumming it to an extent that causes serious slowness on light load. The other is the collection of the jelly around the top pivot and its solidifying in cold weather to the extent that the meter may be from 10% slow to stopped on light load.

Even though lightning was considered the least important cause contributing to the weakening of magnets, indications are that where the practice of grounding the neutral conductor after it has passed into or through the meter socket is followed, it may become a problem even though lightning storms are not of unusual severity. This will be true unless copper plated or Almico magnets are used or unless some other method is devised to prevent this particular fault.

Table I—Percentages of Meters in Various Speed Groups on As-Found Test

(1924 COVERS THREE SYSTEMS, OTHER YEARS SIX SYSTEMS)

Year	Load	Below 96%	96-98%	98-102%	102-104%	Over 104%	No. of Meters
1924	10%	5.91	5.23	79.65	10.82	1.68	16,868
	100%	1.82	2.31	86.56	8.55	1.84	
1929	10%	4.00	5.33	83.30	7.63	.76	78,585
	100%	.70	2.30	87.51	8.96	.54	
1934	10%	3.54	5.14	84.66	6.14	.52	52,875
	100%	1.12	2.59	89.58	6.21	.23	
1939	10%	4.40	7.10	78.87	8.81	.83	84,070
	100%	1.11	2.14	88.47	7.77	.38	

It was thought that it might be possible to show an improved "as found" percentage in recent years due to the improved characteristics, and the questionnaire therefore included a request for "as found" test results for the years 1919-24-29-34 and 39. From the replies, it has been possible to make Table 1.

The test results for 1929 show a marked improvement over 1924 even though it is not likely many later type or temperature compensated meters were in use at that time. While 1934 showed a slight improvement, this was lost in 1939, even though approximately 40% of the meters now in use are of the compensated type. Part of the failure to show improvement may be due to a general increase in test period. For 1924 and 1929 the average was about five years; in 1934 it approached six years, and seven years would be about right for 1939. The above tabulation is not an average of extremes. since all companies agreed within fair limits.

The change in magnet steel during the war may have been responsible for the poorer showings, particularly on the fast side, during 1922 to 1924 and the use of temperature compensated standards may have contributed to the better showing in 1929. However, compared to 1929, the general conclusion must be that if there has been any improvement in meters that may be reflected in "as found" test results, it has been fully utilized in an extended test period.

While it has been stated that an extension of test period is largely a matter of opinion to be decided, this of course, is modified by the control placed by various state commissions. A resume of requirements in the Northwest follows:

Idaho has no state regulations concerning meter testing.

Oregon requires a test before or within 60 days after installation. There is no schedule for routine testing, but this is largely controlled by a provision requiring the utility to rebate the customer where a meter is found in excess of 2% fast. The rebate is limited to a six-month period unless a definite date as to the cause of error can be fixed. In addition the utility is required to make a free test at the request of the customer not oftener than every twelve months. The utility may require a deposit in case of more frequent request tests, the deposit to be refunded in case the meter is in excess of 2% fast.

Utah rules require routine testing which for single phase meters to and including 50 amp. is on a five year periodic basis with a provision that an inspection of a meter tested within two years of the regular periodic test shall be considered to be a periodic test. Provisions for request tests are similar to the Oregon rule except there are no definite rebate requirements. Adjustment of bills is subject to consideration by the Commission.

A report on State requirements in Montana was not received and the writer apologizes for failing to obtain similar information from British Columbia.

Washington, compared to Utah and Oregon, has prescribed stricter routine testing rules. A five year test period is required of all single phase meters 25 amperes and less, and three years on 50 ampere meters. The request test rule is about the same as for Oregon except that the utility is not required to adiust the bill unless the meter iis in excess of 4% fast.

While a complete lack of regulations may be the most desired state of affairs, the Oregon rules appear to be the most logical by allowing freedom to the utility in designing an economic test schedule that may progress with improvements in equipment and technique, and at the same time by performing their primary duty of protecting the public from overcharges.

Before concluding this report there are certain theoretical considerations that may be of some worth. These arise from a study of "as found" test results and the question that occurs as to whether the newer improved meters should be judged by the standards established for the older uncompensated meters. The modern meter might be compared to a modern automobile. Even though considerable more car is purchased today for the same money, we would not think of driving with a broken spring or shock absorber even though the car may still be easier riding and easier to handle than the car of twenty years ago. In other words, standards established 15 or 20 years ago should not be applied to equipment of today because the practical ability to produce the equipment established the standard, and equipment of today establishes its own standard.

This has a still more practical application. On the basis of national averages a meter 2% in error today will have the same effect on gross revenue as

a meter 3% in error 20 years ago. With the margin of profit narrowed considerably by increased taxes, a higher degree of integrity is demanded of meters than was necessary 20 years ago.

A criterion of performance of today's meters could be based upon possible errors of calibration. These errors are somewhat as follows: rotating standard 0.3%, tester (personal error); 0.3%, range of calibration (permissible limits of error in which meter is calibrated); 0.3%, variations in temperature (compensated—outdoor metering); 0.3%, voltage error (changes in line voltage between test periods); 0.3%, for a total of 1.5% possible error between test periods which may all add on the plus or minus side. In other words it could be possible to calibrate a modern meter and on recalibration under different conditions, find the meter as much as 1.5% plus or minus when no actual change in registration has taken place.

Because of lack of temperature compensation, larger voltage errors and calibration with standards not having temperature compensation, the meter of 15 or 20 years ago, undoubtedly had a possible error of about 3.5%. Therefore, if test results are to be comparable, the present-day meter should show as large a grouping between 1.5% plus and minus as the meter of 15 or 20 years ago showed between 3.5% plus and minus. It should be borne in mind that the errors mentioned herein are possible errors and not probable errors.

But in spite of the necessity for higher standards, the writer is of the opinion that the views previously expressed herein that the improved meter will aid in extending the test period, will be sustained by a careful analysis of test results. However, it is a question that may be worth extra effort to obtain a convincing answer.

Reconstructing Old Meters

By L. H. KISTLER
Northwestern Electric Co.

PURPOSE of this paper is to bring up-to-date the progress of the various companies in reconstructing old meters for use on modern wiring devices and circuits. A questionnaire was sent to the member companies of the Association to obtain data on the progress of their reconstruction program to Jan. 1, 1940. A summary of the replies follows, and where available a comparison is made between the practices on Jan. 1, 1938.

1. Do you convert old style meters to socket type? Yes, 11; No. 0 (1938: yes 8; no, 1).

2. If so, what types and sizes are converted to socket type and total number of each to January 1, 1940? Types: G-E I-14, I-16, I-20; West O.A., O.B., O.C.; Sangamo H., H.C.; Duncan M-2, M-D. Sizes: 5 to 50 amp., 2-3-wire, single-phase. Quantities: total number converted 55,887 in 1938, 114,103 in 1940. (1940 data estimated for 2 companies).

3. Have costs changed materially since January 1, 1938? No.

4. What new developments have been made to effect savings in labor or material in meter conversions?
   (a) Die for crimping ends of current coils
   (b) Automatic drill and tapper
   (c) Eyelet setting plier
   (d) Home-made plugs for sockets
   (e) Photo electric testing
   (f) Gage for checking meter disks and shafts for trueness
   (g) Die for forming nameplates
   (h) Press for tightening disks on shafts.

5. Do you rewind or rebuild old style small capacity meters for use on larger loads or higher voltages? Yes, 6; no, 5 (1940).

6. Please list any money saving ideas that you have developed for use in changing meter capacities.
   (a) Change in iron in potential circuit to increase torque.
   (b) Use of magnetic shunt plugs in potential magnet circuit to permit use of old 110 volt coils on 220 volt circuits.
   (c) Make own current coils.

Discussion

L. H. KISTLER (in answer to a question as to the type of jewel used): The tendency is now to go to the ball type jewel rather than the pivot.

(The question was asked as to what was the percentage of sequence meters now in service among the member companies, and answers ranged from 20% to 64%.)

KISTLER: We have done some rebuilding of old 2-wire, 110-volt meters to make them into 3-wire, 220-volt socket-type meters. It has been a question with us whether this was justified. These rebuilt meters can be calibrated to 100%. We first used fish paper insulation but found the meters running up to 1½% slow. We thought temperature was affecting this so we tried insulating with mica stamped to the right size and thickness. Mica is not affected by heat and we believe we have eliminated this trouble.

Electrical Equipment Committee—Systems Engineering*

Progress Report on Rural Planning

By D. F. MISZ
Puget Sound Power & Light Co.

INTENT of this report is to give a resume of the developments of overall planning of transmission, substation and distribution facilities of power systems which supply rural territory and to point the way toward an ultimate plan for economical and satisfactory service. The Overhead Systems Committee and the Electrical Apparatus Committee have in the past, or will in the future, go into the engineering details pertaining to this subject and an effort has been made in this paper to keep away from such details as much as possible. The original report under this subject was presented by the Power Systems Engineering Committee in 1932 and an attempt has been made to follow the same general outline in this paper.

The rural territory supplied by the member companies of the Northwest Association can be divided roughly into three general classifications, as follows:

A. Rich soil areas, usually without irrigation, where farms may average about five acres under intensive cultivation. Houses will average about 10 to 20 per mi., with a high percentage of cooking and water-heating load and with small power load, brooders, etc.

B. Highly productive irrigated areas, using considerable power for pumping in addition to domestic use. Houses will average about 5 per mi.

C. Dry-farming or less productive areas in which the farms are of considerable size, with principally domestic and small power loads. Houses will average 1 to 5 per mi.

*O. L. LeFever, Northwestern Electric Co., chairman; B. C. Electric Railway Co., A. Vilstrup; Idaho Power Co., H. R. Moore; The Montana Power Co., B. Hamilton; Pacific Power & Light Co., K. I. Davis; Portland General Electric Co., E. F. Anderson; Puget Sound Power & Light Co., R. Rader; Utah Power & Light Co., D. L. Brundige; The Washington Water Power Co., C. E. Cannon.

A questionnaire was submitted to each of the member companies requesting data on present practices in serving the three classes of rural territory. A high percentage of replies was received and was used as a basis for the preparation of this paper. Table I shows the features of four typical systems in the Northwest.

Transmission

Transmission voltages are still governed largely by the requirements of loads in cities and towns as they were in 1932 and will, undoubtedly, continue to be so governed for several years. Some of the companies have reported the use of lower transmission voltages for the heavier-loaded Class A territory, indicating that the larger number of substations required for this class of service makes it economically feasible to use a special secondary transmission voltage. Problems of voltage control which arise from the use of these lower voltages, especially in localities of high load density such as may be found in areas adjacent to large cities, sometimes offset the savings realized in the lower substation investment. Extreme care should, therefore, be exercised in the selection of a secondary transmission voltage.

The double source of transmission supply predominates for the Class A and B territory, either by the use of duplicate lines or the loop system, while single lines are the rule for Class C loads. Service continuity is coming to play a more and more important role in rural service, due to the almost universal use of the radio, refrigerator, electric pumps and other appliances. Thus, we find that when the revenue justifies, the utilities are planning their systems to give maximum continuity of service.

Transmission switching for all classes of rural service is still largely manual and will probably continue so until the loads justify the more expensive automatic switchgear. An infrequent outage of from 15 to 30 min. while manual switches are being manned and operated does not as a rule cause any great inconvenience in the rural areas, even to incubator or brooder loads, and until such time as the loads do justify greater service reliability it seems unnecessary to make the additional investment for automatic equipment.

Substations

The prevailing type of distribution substation is the outdoor wood-pole variety, though the trend is now toward the use of the steel structure. The advantages of steel are, of course, its appearance, long life, small labor cost for erection, and nearly 100% salvage in case of removal. Because of the small labor costs the steel structure is very little more expensive than the unsightly wood-pole substation.

Our own company has, in the past, used a large number of wood-pole structures in rural areas. The transformers and associated equipment are mounted on a platform 18 ft. above the ground and step down from a secondary transmission voltage of 13,000 to the distribution voltage of 2,300 or 6,900. However, with service continuity and good voltage regulation being demanded on such a large percentage of the rural lines, thus requiring the installation of reclosing oil circuit breakers, regulators, bypass switches, etc., it has become difficult to provide the necessary space on platforms at a reasonable cost. We have, therefore, favored the use of steel substations during recent years with all equipment situated on the ground. If and when additions are necessary, it is a simple process to extend the structure the required

Table I—Typical Northwest Rural Systems

Company Number	1	2	3	4
Class of Territory Served	B	A	A, B and C	C
Ave. load per square mile..	9 kw	Not given	Class A—15 to 20 kw. Class B—10 kw. Class C— 5 kw.	3 kw.
Transm. voltage.....	45% 66 kv. 55% 44 kv.	55% 11 kv. 45% 24 kv.	Rural areas served from urban substations or gen. stations.	100% 22 kv.
Transm. supply.....	70% loop 10% duplicate 20% single	11 kv. is 100% single line but can be fed from different subs. 24 kv. 58% loop, 35% duplicate, 7% single	—	20% loop 80% single
Transm. switching.....	90% manual 10% automatic	100% automatic	—	90% manual 10% automatic
Type of substation.....	Outdoor steel	Steel	—	Outdoor wood pole
Ave. cost of substation.....	$15.00 per kw.	11 kv. $14.00/kw. 24 kv. $12.50/kw.	—	$33.00/kw.
Automatic voltage regulation	90%	80%	Class A—40% Class B—20% Class C—30%	5%
Distribution voltages.....	90% 6.9/11 kv. 10% 2.3/4 kv.	73% 2.4 kv. 25% 7.2 kv. 2% 11 kv.	Class A—40% 11 kv. —60% 6.6 kv. Class B— 5% 11 kv. —85% 6.6 kv. —10% 2.3 kv. Class C—60% 11 kv. —30% 6.6 kv. —10% 2.3 kv.	70% 2.2 kv. 30% 6.6 kv.
Primary ties bet. substations	Yes	Yes	60% in Class A 20% in Class B	No
Automatic reclosing switches	Yes	Yes	Used in 10% of lines in Classes A and C	No
Time delay on automatic switches (sec.).....	60% 0-30-75 40% 15-30-60	100% 0-20	12 to 15	—
Is difficulty experienced in coordinating branch line fuses with main line or sub. fuses or circuit breakers	Yes	Some	No	Very little
Is common neutral used for primary and secondary	Yes	No.	No, but is planned for use in future for Class C territory	No
Is common neutral increasing or decreasing.....	Increase	—	—	—
Are majority of transformers used single or double primary bushing...	Single	Double	Double	Double
Kva. of capacitors in use...	235*	None	None	None

*System reports satisfaction, plans future installations, others do not. None of the systems use either primary or secondary neutrals. All report fused primary branch lines, and such use of fuses increasing.

amount to provide the necessary additional space.

Distribution

A number of the companies report a high percentage of their rural distribution in the 6,900-volt-delta and 11,000-volt-star class. With the greater load densities now encountered and the close voltage regulation demanded, this voltage is found to be far superior to the 2,300/4,000-volt class. Substations can be spaced farther apart and no operating difficulties are encountered which cannot be corrected by the use of modern equipment. The tendency during recent years has been to cut over rural 2,300/4,000-volt lines to 6,900/11,000-volt, and as time passes the lower-voltage lines will be largely eliminated.

Practically no primary and secondary networking was reported and very few of the companies reported the use of primary ties between substations. The scattered character of load and comparatively small revenue in the Class B and C territory would probably make networking too costly, but systems in at least a portion of the more thickly populated Class A territory should be suited to networking. Radial systems are easily and economically converted to networks by gradual stages, and provide voltage regulation and service continuity consistent with the modern demands of service.

Primary ties between substations can sometimes be used to a distinct advantage to remedy voltage troubles or improve service continuity. A description of the method used to satisfy a recent complaint in our own company, while not pertaining to a typical rural load, might serve to illustrate the advantages which may be expected from primary ties between substations.

We were serving a 300-h.p. wound-rotor-type induction motor used on a coal mine hoist. This motor started under load from 12 to 15 times per hour and caused severe voltage fluctuations. The 11 mi. of 13-kv. line serving the load passed through a heavily wooded section of country and outages due to falling trees were quite frequent during stormy weather. A second 13-kv. line, 18 mi. long, served from a different substation, was used as an emergency source of power for the mine load, and while service continuity was better on this second line, voltage fluctuations were still to great and affected lighting loads to such an extent that it could not be used as the permanent feed for the mine. However, by the simple process of connecting the two 13-kv. lines together through a set of fuses, thus paralleling the two substations, we found that voltage fluctuations were decreased from a maximum of 16% to a maximum of 5%. The hazardous 11-mi. line would be automatically disconnected by the fuses in case of trouble, leaving the mine still operating on the 18-mi. line. Therefore, a substation tie solved a voltage and service problem at a cost far less than would have been required for any other method.

The use of automatic reclosing feeder switches and fused primary branch lines was reported by many of the companies indicating the trend toward better service continuity. Very few reported the use of the common neutral for both primary and secondard although it was indicated that its use is on the increase. Because of the large number of grounds required for the common primary and secondary neutral there is sometimes considerable interference trouble with rural telephone systems. Until such time as this difficulty can be corrected its use will, undoubtedly, be restricted.

Very few capacitor installations were reported. However, a few of the companies indicated they were planing future installations, and those companies reporting present installations had experienced no difficulties with their operation. Because of the many satisfactory installations in the East, it might be well for engineers to investigate the possibilities of capacitors as a means of correcting voltage troubles before other methods are used. Oftentimes a comparatively small investment in capacitors will make it possible to defer larger investments for some years to come.

While no information was requested from the member companies pertaining to the use of the step-voltage regulator, this piece of equipment has done much to improve voltage conditions in rural areas during the past five years. Because of its low cost and simplicity of operation it can be used on circuits whose revenue heretofore has not justified automatic voltage regulation. Due consideration should always be given the use of this form of voltage control when voltage problems arise on rural systems.

Conclusions

It is apparent that utilities throughout the Northwest are making a creditable showing toward improving service in rural areas through the use of modern ideas and equipment. Such equipment, however, if not tied in to a well coordinated system plan, may lead to investments which cannot be economically justified.

Therefore, if it has not already been done, the utilities should design a model system for each area which they serve, looking as far into the future as may be reasonable. Consideration should be given to the use of networks, ties between substations, capacitors, step-voltage regulators, common neutral sys- should be made to fit into this ultimate tems, etc., and all future improvements plan. Such a method of approach will eliminate to a large extent the tendency to allow a system to grow along the lines of least resistance and will ultimately create a system best suited to the needs of the territory which it serves.

Discussion

LEE COOK: One major objection to the wood-pole substation structures built a long time ago is that they are unsightly.

HENRY BERK: One of the chief advantages of steel substation structures with the equipment on the ground, as pointed out in Mr. Misz' paper, is that you can build on to such structures with comparatively little cost.

A. B. CAMPBELL: With regard to the use of multi-grounded neutral, a hearing in Iowa brought out the fact that this system created no disadvantage from the standpoint of relations with telephone companies.

O. L. LEFEVER: We can probably force the telephone lines to make correaction, but in the case of farmers' lines we sometimes do not want to do this for fear of creating bad public relations. Also, these lines are frequently insufficiently financed and have no money to make the correction.

A. E. BOND: When two lines are tied together by fuses it would be possible to get single-phase on a 3-phase line.

D. F. MISZ: We obviate this by feeding both the ends of such a line.

R. R. RIES: With reference to manual switching, sometimes you can't get at the manual switches soon enough. The REA's in our territory are going to automatic fusing.

R. S. DANIELS: With reference to large motors on rural lines starting under load, we had a 440-volt motor on a rock quarry. When it stalled it pulled 540 amp. The swing was too fast for the regulator, so we corrected the trouble by installing a capacitor.

JOHN BANKUS: We have a 24-kv. line with saw mills on it. A series capacitor smooths out the fluctuation.

LEE COOK: We will probably have to look forward to the time when we will of necessity loop our circuits, but I know of an 80-mi.-long radial feeder. which, properly fused, has operated all right. We should choose the most economical means taking into consideration the service on the line.

Electrical Equipment Committee—Meters, Service†

For location of two reports of this sub-committee see index, p. 71.

† C. E. Cannon, The Washington Water Power Co., chairman; B. C. Electric Railway Co., A. Vilstrup; General Electric Co., J. F. Spease; Idaho Power Co., E. A. Woodhead; Northwestern Electric Co., O. W. Hurd; Pacific Power & Light Co., R. E. Forman; Portland General Electric Co., W. E. Enns; Puget Sound Power & Light Co., A. Shipek; Utah Power & Light Co., D. L. Brundige; West Coast Power Co., Henry Berk.

Electrical Equipment Committee Apparatus, Design*

Breaker Inspection & Maint'nce Schedules

By R. H. JOHNSON
Puget Sound Power & Light Co.

IT IS my endeavor to establish a schedule which could be followed by any company. This, you no doubt will agree, is difficult.

Oil circuit breakers are the key to any schedule for station equipment, forming the basis on which the frequency of inspection is determined for station equipment in general.

Several of the member companies state that annual inspection of all equipment is general practice. One member company who has established a more definite program of inspection submits the following procedure.

It reports that oil circuit breakers are overhauled every six months, the contacts dressed or replaced if necessary, the oil filtered if found bad, and other repairs made if required. It is assumed that this six-month inspection includes all breakers regardless of voltage rating. Also, it is their practice to examine and overhaul if necessary any oil circuit breaker which has tripped out on one short circuit. Further, this company has a definite schedule of filtering oil in transformers. It filters the oil in outdoor transformers in the summer, and a dielectric test of the oil is made six months later. Indoor transformers are filtered in the winter and tested in the summer. As a result of this routine filtering, the oil is kept in good condition without sludging, and also is prevented from becoming too viscid. Motor bearings and mechanical equipment are overhauled or inspected three times a year. A special crew of several men is employed for this inspection and maintenance work. The crew is equipped with a special trailer on which is permanently mounted the filtering equipment, storage tanks for transil oil, and a small derrick. The trailer is hauled from station to station as the schedule requires.

Another company reports that oil circuit breakers are given a thorough overhaul once a year but that breakers which were built previous to 1932, are inspected after one or more short circuits. Other breakers are allowed to exceed the yearly period of overhaul if it has been found that there is very little burning of the contacts or carbonization of the oil. It also reports that all breakers are operated once each month as a check of the mechanism, except certain types on which a weekly check has been found necessary.

Several other companies report inspection and maintenance of oil circuit breakers in a general way only. However, it seems to be general practice to overhaul the equipment once a year and to make an inspection after every severe short circuit wherein the breaker shows distress.

Puget Sound Power & Light covers its inspection and maintenance as follows.

All equipment in major stations, including oil circuit breakers and associated equipment, is cut out of service and thoroughly inspected at least once during each three-month period. The oil circuit breaker equipment in less important stations is inspected and overhauled once each year. Inspection consists of cleaning the bushings and oil gages, examining connections for looseness or corrosion, checking the mechanism for flaws, loose nuts, broken or missing cotter keys, stiff toggles, and worn bearings, and the bearings and mechanisms are lubricated. Rust is removed where it is evident and spotted with a metal primer and later painted. The oil circuit breaker is then closed by remote control and tripped by the closing of the relay contacts. In case the breaker is equipped with automatic reclosing mechanism it is tripped out through the relays the required number of times to complete its cycle of reclosing operation.

The frequency of the above inspection may be changed to monthly where deemed advisable, such as in the case of oil circuit breakers on rotating equipment which are operated frequently and very often receive rough treatment. The above general inspection is made by regular operators in attended stations. In unattended stations the inspection is performed by regular inspectors employed for the purpose. No maintenance work is done by these inspectors except extremely minor repairs or adjusting.

When the quarterly inspection is made on oil circuit breakers of the 2,300- and 4,500-volt class, the tanks are lowered and the contacts dressed. If the breaker has received one or more operations through a fault, and shows distress, it is taken out of service at once for an overhaul.

In the higher voltage classes the oil-circuit-breaker tanks are never lowered nor the contact assemblies examined except when overhauled. The overhaul period is determined on a definite number of interruptions from line faults.

Transformer inspection consists of cleaning and inspecting the bushings for leaks or cracks and loose connections. Conservator-type transformers are inspected for low oil, dirty oil gage glasses, water in the conservator drain pit, high oil in the explosion neck, and gasket leaks. Inert-air gas-ceiled transformers are inspected quarterly and tested for oxygen content twice a year.

All regulators are checked and tested once each month. City substation regulators are inspected every three months and the suburban once a year. Inspection consists of oiling the mechanism, checking the operation of the automatic equipment and testing the oil.

Other equipment, such as instrument transformers, disconnecting switches, busses, is inspected at the same time as the breaker equipment.

Protective relays controlling oil circuit breaker operations are inspected and tested once each year for accuracy of operation. They are cleaned, and the contacts dressed, bellows oiled, etc.

Control batteries are inspected each month by taking individual cell readings and gravity tests.

* C. D. Raney, The Washington Water Power Co., chairman; B. C. Electric Railway Co., B. deM. Mertens; The California Oregon Power Co., V. W. Hammond; Eastern Oregon Light & Power Co., O. D. Lanning; Idaho Power Co., R. D. Jefferson; The Montana Power Co., J. P. Medlin; Mountain States Power Co., G. McClellan; Northwestern Electric Co., Tom Perry; Pacific Power & Light Co., A. E. Frey; Portland General Electric Co., J. C. Henkle; Puget Sound Power & Light Co., R. H. Johnson; Utah Power & Light Co., H. H. Krueger; West Coast Power Co., Henry Berk.

In view of the thought given this subject by the various companies reporting, it is evident that there is a definite need for regular inspection and routine maintenance of station equipment, and more particularly oil circuit breakers. I, therefore, submit a plan by which a schedule can be established. However, this schedule would necessarily be varied somewhat for the individual company concerned. Oil circuit breakers vary so greatly in size, use, importance and ability to perform with a minimum of maintenance that it is necessary to analyze each case individually. This I have attempted to do in as brief, yet in as clear manner as possible.

I believe, in general, that oil circuit breakers can be divided into two classes and treated separately: (1) the 7,500-volt and lower voltages; (2) the higher voltages. The lower-voltage type by reason of size and use can be considered as coming under a routine inspection and constitutes a more or less routine operating problem. The higher-voltage breakers in most instances are difficult to take out of service and costly to disassemble for contact inspection because of requiring in general more help than is normally employed for operating purposes. In many cases specialized mechanics are required.

Therefore, inspection becomes an overhaul problem because the contacts and contact assemblies are never inspected until a general overhaul is deemed necessary. It would, therefore, seem proper to establish a definite schedule based on a predetermined number of interruptions caused by line faults, and this number of interruptions should be based on several factors which are essential to safe operation of equipment and continuity of service.

To determine the number of operations a certain breaker can stand before an overhaul, it would be essential to have an acquaintance with that particular piece of equipment, and its ability to perform. This can best be accomplished by keeping a history record. The record can be in the form of a log book, file cards, or a loose leaf. The record should be kept by the one who does the inspection or is directly responsible for the inspection of the equipment. It should include the number of operations, the severity or nature of the operation, the condition of the breaker as found on each inspection, and a complete story of what was done at overhaul periods. The record can be expanded for other purposes, such as: a guide for ordering new parts or maintaining a supply of spare parts. The prime reason, however, is to furnish information by which an overhaul schedule can be set up for each oil circuit breaker of the higher voltage class.

However, the following factors may have a bearing on establishing a definite number of interruptions based on ability only. The first would be the importance of the load dependent on the breaker's continued operation without failure. For example, a breaker on an important interconnected transmission line, heavily loaded, would necessarily be expected to be given a higher factor of safety than a similar-voltage breaker on a branch transmission line of much less load. The second factor would be the breaker's duty and its rated interrupting capacity. Knowing the per cent of duty normally imposed on the breaker would give an indication of the magnitude of the faults recorded. A third factor would be the age of the breaker, as, through years of use, vital mechanical parts become crystalized and deteriorated tending to cut down the ability of the breaker to withstand automatic operations.

In addition to the occasional overhaul mentioned above, it is advisable to cut the breaker out at least every three months and wipe off the bushings, inspect and oil the operating mechanism, check the condition of the oil and operate the breaker through the relay contacts. Once a year an additional check could be made to determine the ability of the breaker to operate through its protective relay equipment by passing sufficient current through each phase of the switch to permit it to relay out.

The lower-voltage breakers could be treated in much the same manner, but it will be found, by reason of size, accessibility, age, and the use to which they are subjected, that a regular quarterly inspection should be made, and in some cases a monthly inspection. Generally, it is possible to do all maintenance work necessary at the time of inspection.

Oxidation of contacts on breakers and disconnecting switches is a problem which can be overcome by the use of silver contacts either purchased or applied in the field. One member company is experimenting with inexpensive portable silver-plating equipment.

In conclusion, it is my opinion that if the above facts are considered and adapted to the system requirements of the individual company concerned, it will be possible to establish the basis of an inspection and maintenance schedule for oil circuit breakers and similar equipment.

Discussion

J. HELLENTHAL (in answer to a question about silver plating contacts): The voltage is important in silver plating. If it is too high, you get a spongy deposit. About 2 volts is the proper voltage to get a dense deposit of from 0.002 to 0.004 in. thick. Also the contacts should be clean before plating. If they are not clean, the silver will strip off in a few operations.

A. VILSTRUP: B. C. Electric Railway Co. has a regular procedure for maintenance as outlined in the paper. We have a regular crew which is kept busy all the time travelling a regular route designed to save travel time. We have a separate crew to inspect every oil circuit breaker that opens under certain conditions. We have this separate crew so as not to interrupt the regular maintenance schedule.

J. HELLENTHAL: Most oil circuit breakers will heat when they operate. Before we tried silver plating, we had to replace the contacts. Now we find that the silver plating makes the contact run cool. We have not tried plating disconnecting switch contacts.

J. A. HOOPER: We have tried graphite in a solution with carbon tetrachloride for disconnecting switches. This sticks to the copper and serves fairly well.

J. HELLENTHAL: We have used a combination of graphite and oil. This lubricates the contact.

Test—Maintenance Of 110-kv. Bushings

By J. P. MEDLIN
Montana Power Co.

THERE are in service on Montana Power Co.'s system quite a large number of porcelain-roof bushings which were placed in service as long ago as 1910 and 1911. These are mainly the oil-filled, OB Cat. No. 12879, 110-kv. While they have given remarkably good service for 30 years, they have certain features of design which make it difficult to maintain them in good condition. For instance, there is no means of draining the oil from the bottom except by breaking the oil seal with the clamping nut. If this is done it is practically impossible to remake an oil-tight joint without removing the bushing and thoroughly cleaning the gasket area. Another source of oil leakage is the joint between the top and bottom halves of the porcelain. This is cemented with litharge, which many years of contact litharge, which, after many years of contact with oil, gradually becomes impregnated and finally leaks.

The greatest danger to the bushing is its tendency to breathe, because of the expansion and contraction of its oil contents so that the oil gradually picks up moisture from condensation to a point where it will eventually break

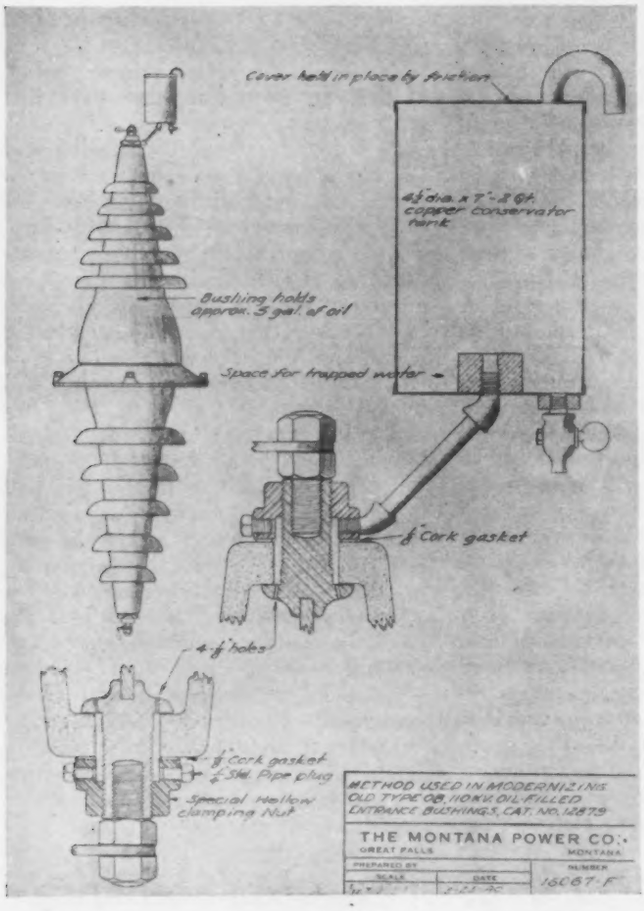
Cover held in place by friction
4½ dia. x 7'-2 Qt. copper conservator tank
Bushing holds approx. 5 gal. of oil
Space for trapped water
½ Cork gasket
4-½ holes
½ Cork gasket
½ Std. Pipe plug
Special Hollow clamping Nut
METHOD USED IN MODERNIZING OLD TYPE OB, 110 KV. OIL FILLED ENTRANCE BUSHINGS, CAT. NO. 12879
THE MONTANA POWER CO.
GREAT FALLS MONTANA
PREPARED BY
SCALE DATE
NUMBER
15067-F

Fig. 1

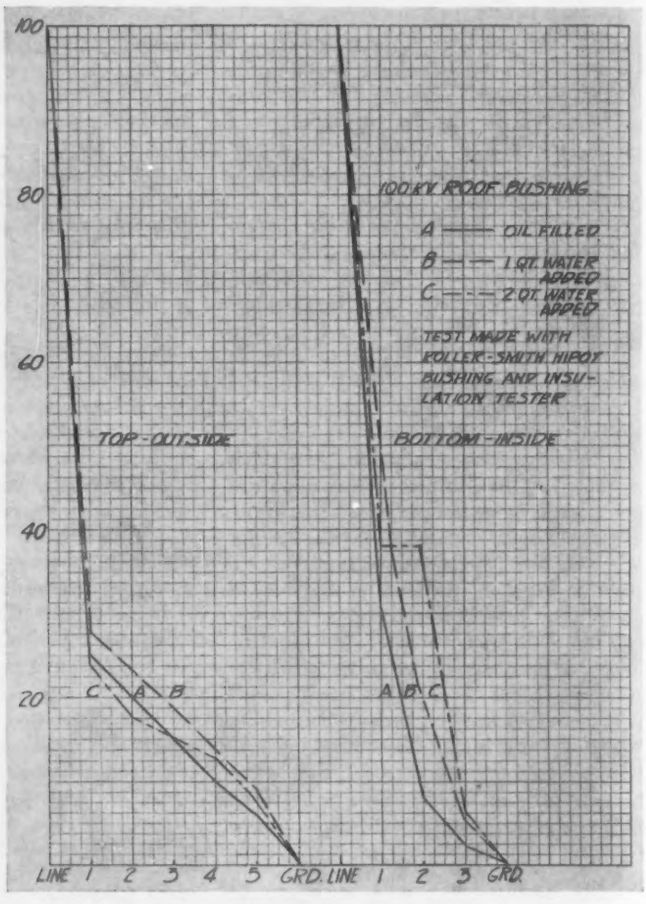
100
80
60
40
20
100 KV. ROOF BUSHING
A —— OIL FILLED
B — — 1 QT. WATER ADDED
C — - — 2 QT. WATER ADDED
TEST MADE WITH FOLLER-SMITH HIPOT BUSHING AND INSULATION TESTER
TOP - OUTSIDE
BOTTOM - INSIDE
C A B
A B C
LINE 1 2 3 4 5 GRD. LINE 1 2 3 GRD.

Fig. 2

down if it is not drained and reconditioned. In a group of six bushings recently reconditioned, we found moisture in all, varying from a few ounces to a pint and a half. These bushings had been filled with oil at regular intervals and had been in service on our 102-kv. system.

Because of the large number of similar bushings in service and the fact that they will continue to function safely if properly maintained, we developed a method of rehabilitation which promises to remove the more important defects. This method consisted of providing: a means of drainage from the bottom without breaking the oil seal, a small conservator tank on the top to prevent the entrance of moisture.

As shown in Fig. 1, a hollow nut was used for the top and bottom clamping. Each nut is tapped for two ¼-in. pipe connections. Using a long ⅛-in. drill we were able to drill a number of holes through the inside flange of the clamping stud to permit the oil to flow down alongside the stud. A thin cork gasket impregnated with G-E No. 1285 Glyptal cement was used for the seal.

The old litharge at the joints was removed with a small chisel and recemented successfully. Care must be taken in obtaining the proper quality of litharge. Also, the glycerine should be pure and reasonably free from moisture.

The repairs made cost approximately $40 per bushing. Since we can reasonably expect many additional years of trouble-free service for these old bushings the expenditure is entirely justified.

Testing

Since it has been fully demonstrated that bushings of this type must be placed on a regular maintenance schedule, and because of the expense and difficulty of draining and removing them, it is desirable that some accurate method of testing them in place be devised.

C. R. Davis, a member of Montana Power's engineering staff, has been conducting a large number of tests on bushings using the Roller-Smith Hipot Bushing and Insulation Tester. He reports quite accurate results with this device in checking a group of 350 bushings, this group representing practically all types now in use on system.

With this device it is first necessary to obtain a curve obtained from the bushing under test. In testing the bushing mentioned in the first part of this paper he first obtained the normal curve and then, by adding small quantities of water at intervals, was able to detect the presence of the moisture with the device. Test curves appear in Fig. 2.

In testing an indoor condenser-type bushing without rainshield, he found an imperfect curve, indicating an abnormal condition. Upon investigation it was discovered that the bushing surface had been splashed with aluminum paint. Following removal of this paint the test curve became normal.

It must be emphasized that in making tests of the various types of bushings care and experience are essential to properly interpreting the curves. Curves of the different types differ radically in form but should conform closely in the same types. From Davis' experience to date he believes it possible to anticipate bushing weaknessses and prevent failure in at least 90% of the cases.

Discussion

J. P. MEDLIN (in answer to a question as to how effective is the Roller-Smith Hipot bushing and insulator testor in indicating the nature of the trouble): When we get an indication from the Hipot testor, we can generally repair the bushing. We clean and revarnish it. We are referring here to the indoor bushing not to the outdoor type

with rain shield. An oil-filled bushing will bleed, which means it will take in moisture.

C. R. DAVIS: We have found outdoor type bushings, compound filled, into which moisture has seeped from the top. This caused the test curve to be off standard.

We had one case where we tested an out door switch that had been giving radio trouble. We found the test curve on the crossarm to be the same as the curve on the first insulator, so we knew something was wrong. We found the pin shorted through the insulator.

The Roller-Smith Hipot testing instrument seems to be superior to any other.

Code Committee*

Code Revisions

By A. B. CAMPBELL
Edison Electric Institute

AMONG changes to appear in the 1940 Edition of the National Electrical Code, the following are of interest to power companies.

National Electric Code

1. New tables for allowable current-carrying capacities were approved. These are based on research conducted by the National Electrical Manufacturers Association and were reported at the AIEE winter convention in January. The types of wire for which new tables have been prepared are as follows:

a. code grade rubber; maximum temperature 50°C.
b. performance grade rubber; maximum temperature 60°C.
c. heat-resistant grade rubber; maximum temperature 75°C.
d. varnished cambric type VB, AVB, and SNA; maximum temperature 85°C.
e. asbestos varnish cable, type AVA; maximum temperature 110°C.
f. impregnated asbestos type AI; maximum temperature 125°C.
g. asbestos type A; maximum temperature 200°C.

In connection with these new current-carrying-capacity tables, another new table requires the application of de-rating factors to the current-carrying capacities given in the table where more than three conductors are installed in one conduit.

2. The following types of thin-wall insulation wires were approved:

a. Conductors having a heat-resistant rubber insulation (type RH) with a wall thickness of 1/32 in. for Nos. 14, 12 and 10 AWG, and having a flame retarding and moisture-resisting fibrous covering to be used in place of Type R wire.
b. Latex insulated wire was approved in sizes of Nos. 14, 12 and 10 AWG for rewiring purposes only, and where it is impracticable to increase the size of the existing raceways due to structural conditions.
c. Synthetically-insulated thin-wall insulation was approved for rewiring to meet increased load under conditions where space is not available in the existing raceways for conductors having the usual thickness of insulation.

Both latex and synthetically-insulated wiring were approved for temperatures of 60°C. and 600 volts respectively.

3. For rewiring purposes, the conduit fill requirements were modified to permit 60% fill when the conduit is occupied by one conductor, 40% when occupied by two conductors, and 50% when occupied by three or more.

4. A rule was approved which does not become effective until Nov. 1, 1941, specifying the type of branch-circuit fuses that will be permitted. In addition to this, a special technical commitee was appointed to study further the matter of branch-circuit fuses with a view to bringing out a design, if necessary, which can be made by various manufacturers and which will be interchangeable between different makes as well as with the present Edison base.

Covered-neutral cable continues to have the status it previously had, namely, that it is listed by the Underwriters' Laboratories for trial installation purposes and, where local inspection authorities permit, may be installed on that basis.

Safety Code

The new edition of the National Electrical Safety Code will consist of two sections and six parts as follows: Section 1, Definitions; Section 9, Methods of Protective Grounding; Part 1, Stations and Substations; Part 2, Overhead and Underground Supply and Communication Lines; Part 3, Utilization Rules; Part 4, Operating Rules; Part 5, Radio Installations; and Part 6, Electric Fences. All of the above sections and parts have been approved by the Sectional Commitee except Part 2, which has been delayed due to extensive considerations necessary on account of certain proposed changes in climatic loadings and strength requirements.

For the first time, the NES Code recognizes in the rules in Section 9, the interconnection of lighting arresters and the neutral of secondary circuits.

Climatic loading assumptions have been changed from ½-in. ice and 8 lb. of wind in heavy loading territory to ½-in. ice and 4 lb. of wind. In medium loading territory, the assumptions of ¼-in. ice and 8 lb. of wind have been changed to ¼-in. ice and 4 lb. of wind. In the light loading territory, the assumptions have been changed from no ice and 12 lb. of wind to no ice and 9 lb. of wind. These values apply to transverse loading only. For conductor loading, the over-all result remains substantially as in the present code. This is brought about by adding a constant to the resultant loading from those mentioned above so that the longitudinal or conductor loading remains substantially unchanged. As a matter of fact, the present sag and tension curve can, in practically all cases, be used as the difference between the two methods of conductor loading assumptions is within the accuracy of conductor stringing.

In addition to the changes in climatic loading assumptions, there has also been some change in the boundary lines between loading districts; also the three grades of supply line construction, namely A, B and C, are replaced with two grades, A and C.

Substantial increases in clearance requirements have been made which apply mainly to spans in excess of about 150 ft. This is due to the fact that since the present code was adopted, long spans of small size conductors with relatively high tensile strength have come into extensive use, making it necessary to increase the clearances for

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† Deceased.

this type of construction in order to avoid too great a reduction in clearance when the conductors are loaded with ice.

One change that has been made, in most cases editorially, is stating in each case where voltage is mentioned whether the reference is to voltage between wires or to ground.

The new edition will contain line-conductor tension limits for stringing and normal conditions. These are a maximum of 35% of the ultimate strength of the conductor is permitted for stringing conditions, but the final unloaded tension at 60°F. is not to exceed 25% of the ultimate strength of the conductor. For several of the different span lengths and types of conductors, when used in the medium loading territory, these two limits control, rather than the loaded condition. These two limits also control under most all of the conditions in light loading territory. Also the differential between 50% and 60% of the ultimate strength of conductors for Grades A and B respectively has been eleminated so that for all grades of construction now provided for in the code, the tension is not to exceed 60% of the ultimate strength of the conductor under the maximum assumed loaded conditions.

A requirement that will be in the revised code which was not in the previous editions is one which calls for double crossarms, pins and insulators on crossing supports when pin type construction is used. Also, a rule has been approved which makes unnecessary head guys on supply line crossing supports where the pole is of sufficient strength to meet the transverse load without the use of side guys.

A change of considerable importance is in Section 27 on Insulators. This, while it contains much of the same substance that is in the present edition of the code, includes a revision of Rule 278 in such a way that it will be more easily understood and, in the opinion of those who prepared this revision, should result in safer construction.

Some modifications have been made in the rule with regard to line splices in the crossing spans. These are still not permitted under all conditions, but the rule has been liberalized.

It should be kept in mind that the above points are not complete and hence should be taken only as a basis for some of the changes that have been made. Numerous other changes have not been mentioned. In most of the changes referred to, there are details which have not been mentioned, but which can be obtained when the revised text of the code becomes available. The purpose of listing these is merely to outline some of the changes in which this group would be interested Furthermore, some of the changes mentioned have been approved by the Sectional Committee while others have been approved by subcommittees and the Technical Committee. This means that some of the changes referred to may undergo further changes before the Sectional Committee finally acts upon them.

Report of Delegate To NFPA Meet

By M. T. CRAWFORD
Puget Sound Power & Light Co.

AS representative of this Association on the Electrical Committee of the National Fire Protection Assn., I attended the meeting Dec. 3-9, at Atlantic City. The Committee met there to make final revisions in the National Electrical Code, 1940 Edition. After a week of sessions that lasted until late every evening, numerous changes were agreed upon. The chairman and secretary then edited the stenographic transcript of the meeting and produced therefrom the 1940 Edition of the Code.

I have here the galley-proof of this new Code for your inspection. Some minor corrections must still be made. After the galley-proof has been approved by the Electrical Committee, it will go to the NFPA governing board and then to the American Standards Assn. for final approval as an American Standard. It will probably be published and distributed sometime this summer or early fall.

As you know, Edison Electric Institute actively promoted a number of proposals for fundamental changes in the code, in order to encourage adequacy and economy in wiring and rewiring work, by using modern methods and materials. By means of extensive research, published reports, and publicity, together with talks at various meetings of other groups, the EEI and the 14 members and alternates on the Electrical Committee who comprise the light and power group, made every effort to get these proposals for code modernization before the industry and the public.

It was felt that opposition to the proposals was based on a mistaken impression that they would merely reduce the cost of wiring and make less work for wiremen, wheheas cost reductions will actually result in an increased volume of work, particularly the rewiring of existing structures for additional load and higher levels of illumination.

Of the four major proposals of the light and power group, two were approved, covering the use of thin-wall insulation, and the increased conduit occupancies in rewiring old buildings. The other two proposals, covering recognition of the CNX wiring method in residential occupancies and the use of bare neutral in conduit, lost the necessary two-thirds affirmative vote by a narrow margin. Our only interest in CNX wiring was to help the small home owner and also help provide a safer job. It is true that the poor man would sometimes do his own wiring with CNX instead of hiring a contractor, but it is also true that he does it anyway, and now uses lamp cord and annunciator wire more times than you would realize.

The use of bare neutral in conduit would be a cost saving in only about one case out of ten, where the number of conductors in the conduit happened to be close to the limit, so that this proposal was considered not very important by some members.

It is felt, however, that we should continue to promote these proposals, and secure as many installations as possible under the code provision for trial installations by special permission of the local code enforcing authorities. In this manner we will have available a considerable amount of field experience to justify code revisions at a future date.

While in the East, I had several conferences with Mr. Campbell and with others who were active on the Sectional Committee which has been engaged in revising the NES Code. By means of these conferences, by the support of Code Committee members who sent letters and telegrams, and particularly as a result of Mr. Campbell's efforts, we were able to secure two very important modifications in the proposed revisions. The first one, which was very important to Washington and Oregon member companies, had to do with the proposal for changing western Washington and northwest Oregon areas from medium to heavy loading. Mr. Campbell was able to carry out our wishes on this and get the committee to leave Washington and Oregon in medium loading classification.

The other change was a minor one having to do with the maintenance of specified clearance from supporting structures of transmission wires on suspension insulators. The original code requirement called for maintaining clearance with an insulator swing of 45°, and this made it difficult to design an economical pole-top configuration of the wishbone type. We were able to secure a modification of this provision to a swing of 30° for wood-pole and crossarm type construction.

Discussion of Code Revisions

M. T. CRAWFORD
Puget Sound Power & Light Co.
Discussion Leader

F. D. WEBER: The NEC now provides for four grades of new wire for listing by the Underwriters Laboratories, but the Laboratories have not yet issued labels for these new wires.

As to electric fence standards, there is a difference between Underwriters Laboratories standards and the new NESC standard.

(In answer to a question as to coupling thin wall conduit) The coupling should have 26 or 27 threads per inch, but it is hard to get the men in the field to use the dye that will cut this thread.

A. B. CAMPBELL (in answer to question as to whether REA construction standards are conforming to NESC): The REA has had representation on the committee formulating Part II of NESC and they expect to conform with this Code.

J. P. MEDLIN: The REA was influential in having the old Montana safety rules changed to NESC in that state.

R. E. KISTLER: The telephone company would like to see the Washington rules changed to the NESC standards.

L. R. GAMBLE: There have been some conflicts with the Washington construction rules in REA and Washington Water Power Co. rural line construction. The REA is using the NESC but it sometimes is at variance with the state law. Each conflict was analyzed and agreement reached as to its safety. The situation was then reported to the Department of Labor and Industries and okehed by that department.

CAMPBELL (in answer to a question about the complaint of the radio people against grounding to water pipes): The scope of the NEC is plainly stated to cover fire and life hazards. The radio people based their complaint on radio interference only. The water people have also objected to such grounding.

WEBER: The electrical inspectors will not approve bare neutral and grounding to water pipes until the report of the water works people is available.

HARRY TECKLENBERG: Our experience in Everett with this grounding to waterpipes has been that hazard is greatly reduced. Short circuits clear readily. Before this, with high ground resistance, there were more fires. This is shown by the official fire records.

WEBER: In the new tables of carrying capacities in the NEC the capacities of larger size type R wire have been cut down. The question is how to get this raised. One way is to put several small wires in parallel.

CRAWFORD: The old tables were too liberal with capacities for the larger wire. The answer is to use small wires in parallel with the new type of insulation.

Transmission and Distribution Committee*

Controlling Radio Interference

By ELLIS VAN ATTA
Pacific Power & Light Company

IN spite of progress the "problem" of controlling radio interference is just as much alive today as it was 10 or 15 years ago. As a matter of fact, some phases of the problem still appear to be a very long way from practicable, economical solutions.

The two most important of these are (1) interference from high-voltage lines (above 11 kv.) and associated equipment; (2) interference from electrical appliances (any piece of consumers' connected apparatus).

Historical

Almost coincident with the advent of radio-broadcast programs, about 20 years ago, the listening public began to complain about radio interference. In those early days, practically all interference was included in the term "static." This rather vague description gradually changed to more specific appellations, such as, "power leaks," "leaky transformers," "cracked insulators," and so on, and in a relatively short time most of the blame for the listeners' irritations was shifted from the lap of mother nature to that of the power company.

With the rapid increase in the use of radios, accompanied by almost equally rapid developments in the sensitivity of receiving sets, came the awareness on the part of power companies that this new business gave warning of adding appreciably to theeir public-relations problems. It soon became evident that the public expected power companies to assume the burden of correcting any and all disturbances. And thus the utilities were led into taking steps to ascertain the truth or fallacy of the apparently popular belief that power lines and equipment were indeed in a sad state of repair.

Table I—
Appliance Interference

Year	Total Interference Orders Treated	Orders Due to Appliances	%
*1934	1163	268	23
1935	1668	531	32
1936	1458	521	36
1937	2220	799	36
1938	2501	877	35
1939	2198	947	43
†1940	454	200	44

*(May 1-Dec. 31)
†(Jan.-Feb.)

The complete historical background of the interference problem is so well known that it will receive no attention here. Suffice it to say that throughout this entire period real efforts have been made by utilities and other groups to cope with the problem of controlling radio interference. The extent of these efforts and the contributions of manufacturers and others require no amplification.

Present Situation

Progress has been made in the elimination of interference from power lines during the past decade. The need for continued study of high-voltage interference is obvious. Some progress has also been made with the elimination of interference from appliances but, unfortunately, not with the rapidity which the seriousness of this particular problem warrants. The figures in Table I, taken from the records of one Northwest power system, indicate the necessity for more attention's being directed to the production and distribution of non-radio-interfering appliances.

* R. J. Davidson, Pacific Power & Light Co., chairman; L. R. Gamble, The Washington Water Power Co., vice-chairman; Allis Chalmers Manufacturing Co., C. T. Hurd; B. C. Electric Railway Co., P. C. Gill; The California Oregon Power Co., R. S. Daniels; Eastern Oregon Light & Power Co., A. B. Olson; General Cable Corp., W. E. Wallace; General Electric Co., C. E. Canada; Graybar Electric Co., E. J. DesCamp; Idaho Power Co., H. M. Jones; Mountain States Power Co., Walter Smith; Northwestern Electric Co., D. A. Hord, Corbett McLean; Oregon State College, F. O. McMillan; Pacific Electric Manufacturing Corp., C. H. Cutter; Pacific Power & Light Co., A. E. Bond; Portland General Electric Co., W. E. Enns, H. R. Wakeman; Puget Sound Power & Light Co., C. H. Hoge, E. R. Nigh; Telluride Power Co., Paul P. Ashworth; Thos. S. Wood Co., T. S. Wood; Utah Power & Light Co., G. W. Westcott; The Washington Water Power Co., Earl Baughn; West Coast Power Co., Henry Berk; Westinghouse Electric & Manufacturing Co., M. P. Buswell.

In many localities troubles from interfering appliances are considerably greater than from other sources, including interference from high-voltage lines.

The lack of standard instruments and methods of measuring radio noise is believed to have been one of the main retarding factors in the earlier work. In other words, the lack of proper tools, with which to build standards of permissible noise levels, or allowable noise voltages of the various known sources of interferences, has undoubtedly been responsible for delay. Without these tools it is obviously impossible to coordinate test results obtained by different groups of investigators.

Measuring Instruments

Recognizing the need for interference standards, a joint committee of EEI, NEMA, and RMA in 1932 adopted specifications for a radio noise measuring instrument and methods of measuring radio noise. These specifications were originally published in NELA Publication No. 32, Jan. 1933, and subsequently revised in EEI Publication No. C-9 (NEMA Publication No. 102 and RMA Engineering Bulletin No. 13), dated Dec. 1935. It is understood that the last named Publication has recently been revised and will be available for distribution within a short time. In the new bulletin the methods of measuring noise remain essentially the same as those recommended in Publication No. C-9, the instrument has been changed considerably, incorporating increased range, increased reliability, and possibly reduction in the cost of manufacture.

It is also understood that at present all the large manufacturers of insulators are using instruments and methods in accordance with these specifications and that many manufacturers of appliances have this same sort of setup adaptable to the noise measurement of appliances. This has already resulted in the redesign of some small appliances. Recent information indicates that many manufacturers of all types of equipment are interested.

While it is agreed that the use of the recommended measuring methods are very desirable for the purposes mentioned above, it is believed that instruments of this type or the methods of measurements are not readily adaptable to the needs of power companies for such radio interference testing equipment as is required for the treatment of everyday run of interference problems. This seems to be the consensus of opinion among various utilities in this part of the country.

High Voltage Insulators

One important contribution has been the development of radio-proof insulators, and today practically all insulator manufacturers are producing reliable insulators of this type. While noise from insulators is not the most important consideration in the subject of high-voltage interference, it is nevertheless true that without some sort of insulator treatment it would be utterly impossible to reduce interference from high voltage lines to reasonable levels. Another forward step might be taken if the production of "standard" insulators could be discontinued. Perhaps this is too much to expect all at once but it would seem that, in the present stage of the art, insulators currently classed as "standard" should more correctly be catalogued as "obsolete." Really, "standard" insulators today should mean those which will operate at normal voltages without the buzzing and frying so characteristic with all untreated units.

Hardware

This is another development, the adoption of which has apparently not been commensurate with its importance. Line hardware holds first place in the matter of actual and potential source of severe interference on all lines operating at voltages above 2,300 and it is believed that the use of static-proof hardware would greatly reduce the number of complaints. In many instances the expense involved in locating and correcting only one such case of trouble would pay for considerable hardware.

Line Chokes

Unless treatment is applied for considerably more length of line than just the section in which reduction of noise is desired, normal noise from other sections of untreated lines may nullify improvements made in the short treated sections. Treatment must also extend to considerable distances beyond other lines which, through coupling with the high-voltage lines, may act as "carriers" to spread noise over the area it is desired to protect. It is therefore apparent that where it is necessary to depend only on the treatment of insulators, hardware, etc., the task may assume dimensions entirely out of proportion to the results which might reasonably be expected. As a matter of fact, where treatment alone is used, it may be necessary to re-insulate or apply insulator treatment to lines in their entirety and in practically no case would such a solution be economically feasible. Apparently the only alternative is to apply attenuation in short sections of line, at the same time isolating these sections from other parts of the line which are not especially treated.

For the purpose of accomplishing this result the most logical conclusion is that filters should be used. Satisfactory filters might consist of the following; (1) Capacitive-type units shunted across the line, providing a very low impedance path for high frequency current either to ground or to act as a high-frequency short circuit across the line; (2) choke coils, offering a very high impedance to high frequency currents, connected in series with the line, or, (3) a combination of both types of filters.

All of the above types of filters are very commonly used in dealing with interference from low-voltage apparatus, but obviously (1) or (3) could not economically be applied to high-voltage lines. Following this line of reasoning, experiments in the use of radio-frequency choke coils in high-voltage lines were started approximately 10 years ago. Since that time, many installations of choke coils have been made, with varying degrees of success. Results obtained in some installations indicate that this method of reducing noise from high-voltage circuits is of considerable value.

Two types of coils are now available, "Tuned" and "All Wave." Good results have been reported with both, but it is believed that the "All Wave" coils will give more consistently satisfactory results.

Certain precautions must be used in the installation of choke coils, regardless of what type may be used. And with either type, it may be necessary to install more than one coil per conductor to obtain satisfactory noise-reduction in the area to be protected. To begin with, the section to be isolated must be free from sources of interference. Another extremely important consideration is that radio frequency chokes must be installed in *all* circuits, of whatever nature, which enter the area to be protected, and which have *any* exposure to the untreated parts of the high-voltage line. In this connection it should be pointed out that "exposure" does not mean any considerable parallel between these circuits and the high-voltage line. Frequently a parallel of less than a span length between the high and low-voltage circuits will be sufficient to saturate the low-voltage line with noise just as thoroughly as though the coupling existed for several miles. Many other cases have been noted where apparent saturation occurred even though no parallel existed between the two circuits, the low-voltage line simply crossing underneath the high-voltage line at right angles to it.

This extremely important point must be considered in the location of the choke coils in "carriers" at their contact with the circuit from which they receive their noise energy. In some cases a coil installed in a noise-carrying conductor at a distance of less than 200 or 250 ft. from the point where it leaves the high voltage line will lose a

considerable part of its effectiveness, due to the transfer of noise to the conductor after it leaves the choke coil. In the event that the coil is installed in the conductor where it leaves the high-voltage line, the result may be that noise will completely bypass the choke, reducing its effectivenesss to practically zero. One make of line choke, apparently quite successful, is rated as follows by the manufacturer: two coils in series, spaced about 300 feet apart, constitute an attenuation section giving a noise reduction of approximately 25 decibels (a noise-voltage ratio of about 18 to 1); three coils in series, with the same spacing, and the center coil having higher inductance than the end units, constitute two sections of attenuation giving a noise reduction of approximately 50 db. (a noise-voltage ratio of about 316 to 1).

Tests on an installation of these coils made about two years ago on an 11-kv. line, with ungrounded neutral, which was acting as a carrier for noise from a 66-kv. line, indicated a noise reduction of approximately 84% at a point directly under the 11-kv. line and 1,100 ft. from the 66-kv. circuit (this point was approximately 200 ft. from the last choke coil). Nearly 100% noise reduction was obtained directly under the 11-kv. at a point approximately 900 ft. from the last choke and 1,800 ft. from the 66-kv.

This installation consisted of two attenuation sections (three coils per conductor, including the neutral) and the noise reduction was calculated at a test frequency of approximately 1,000 kc. However, listening tests were made at several locations along the line at different frequencies in the broadcast band and it was found that practically no noise was evident in this band after the point was reached where the 1,000-kc. test showed nearly 100% noise reduction.

Before this installation considerable difficulty was experienced by most of the radio users in the community served by the 11-kv. line, particularly on broadcast stations above 900 kc., due to noise from the high-voltage line. The complete elimination of this type of interference greatly improved conditions for reception in that community. It should also be pointed out that this installation was made during the summer when normal conditions for reception are usually not too favorable and at a time when the noise level of the high-voltage line was high.

Another similar installation, in a 6,600-volt line, acting as a high voltage noise carrier, was made a few months ago with equally satisfactory results. No actual test data are available on this installation at the present time but "listening" tests indicate complete absence of high-voltage noise in the protected area. It is quite evident that the proper treatment to be applied to high-voltage lines in any given case, and the results which may reasonably be expected from such treatment, largely depend on local conditions.

Antennas

Although some of the advancements in the design of radio receiving apparatus have materially added to the complexities of the interference problem, (for instance, radio receivers with sensitivity as low as one or two microvolts per meter) at least one real contribution to the control of radio interference has been made by the radio industry. This is the noise-reducing antennas. Many different types of alleged noise reducing aerials have been developed, with varying degrees of success.

One aerial kit being used extensively in this part of the country, with consistently good results, is known as the "Magic Wave Aerial." It consists of two transformers and an unshielded, twisted-pair transmission line, which can be installed on any aerial, old or new. It is also adaptable to connection of several radios to one aerial. Many successful installations of this system have been made in particularly bad locations where other methods have failed to solve customers' troubles. In general it has been found that good results can be practically guaranteed wherever the aerial proper can be placed in a good location relatively free from interference. Its main application in this territory has been to eliminate or reduce interference from high-voltage lines, but many installations have been reported where satisfactory results have been obtained in reducing or eliminating noise from appliances.

Noise Levels

Radio interference is a relative proposition and it might be well to re-define it as, "The reception of certain undesirable signals which are stronger than those desired, or at least possessing strengths of such magnitude, in respect to the wanted signal, as to make reception of the latter objectionable." With this definition in mind, it is apparent that in communities where broadcast stations daytime field intensities run in the order of, say 1,000 microvolts, far less attention to radio interference elimination would be required than in communities wherein much of the daytime reception is on field strengths as low as 100 microvolts or less.

There appears to be no definite agreement as to the allowable signal-to-noise ratio for satisfactory reception. If a ratio of 30 decibels is assumed to be satisfactory then the first community could tolerate interferences producing approximately 30 microvolts of noise, whereas the second community would have cause for complaint if noise voltages exceed 3 microvolts. If a signal to noise ratio of 20 db. could be considered satisfactory, then an additional 70 microvolts of noise might be tolerated in Community No. 1. In the second community a signal to noise ratio of 20 db. would permit only a 7-microvolt noise increase, or a limit of 10 microvolts of noise. In other words, if the same noise level that would give a signal to noise ratio of 30 db. in Area No. 1 existed in Area No. 2, the latter would be forced to listen to programs at little more than 10 db.. signal to noise ratio, a value certainly too low to permit decent reception.

Now, if this comparison is applied to proposed treatment of high-voltage lines in the two areas, it becomes apparent that the treatment which will produce satisfactory results in the area of comparatively high signal strengths may be entirely inadequate for the area of low field intensities.

It is understood that the Federal Communication Commission minimum signal strength for satisfactory program service is 500 microvolts, yet many communities in this part of the country regularly expect service from stations with little more signal strength than 100 microvolts. And, strange as it may seem, fairly good, and even excellent reception is enjoyed a reasonable part of the time in many localities in the Northwest with these low daytime field strengths. That fact certainly reflects to the credit of everyone who has made any real efforts to control radio interference in this territory. Without these efforts such conditions could not exist, except in localities far removed from the conveniences of electric service.

At the present time no standards of maximum allowable noise levels to permit satisfactory radio reception under given values of signal strengths have been adopted or proposed. These will no doubt be established when enough data are available.

Throughout the entire period of radio interference investigations, simple and comparatively inexpensive corrective measures have been applied to appliances in the field and this has been done with excellent results in areas where low field strengths from broadcast stations is the rule. It would seem that the proper application of small capacitive-type filters to universal-type motors, for instance, could be accomplished now (and it is felt that this should have been done years ago) without necessitating accumulation of any more data than are already available. The same reasoning might well be applied to many other pieces of offending apparatus.

Radio interference is as old as radio broadcasting itself. It may be a problem

so long as radio broadcasting exists or until some radical changes in the art takes place, as, for instance, the much talked about "Frequency Modulation" system.

However, it must be recognized that the problem is still here and so long as it does exist all possible efforts should be made to solve it.

Choke Coil Installation Costs

Following are the approximate material costs per conductor for applying the radio frequency choke coils mentioned in this paper:

POWER CIRCUITS:

No. of Coils per Conductor	Amp.	Approx. Cost Per Conductor (labor not included)
Single Coil	5	15.50
	20	31.00
2 (one attenuation section)	25	48.50
	50	70.50
	100	70.50
	150	114.50
	200	160.50
3 (two sections)	25	74.50
	50	108.50
	100	132.50
	150	174.50
	200	243.50

TELEPHONE CIRCUITS:

Single Coil	—	8.50
2 Coils	—	12.00
3 Coils	—	18.00

The above costs for material per conductor will be double where it is necessary to install choke coils at each end of the treated sections of lines.

Discussion

ELLIS VAN ATTA (in answer to questions about the sale of interfering appliances by radio dealers and about regulatory ordinances): We have found several radio dealers who sell other appliances that cause radio interference, such as heating pads.

The effect of regulatory ordinances generally seems to be zero. People get up a petition, pass an ordinance and then expect the trouble to disappear. But what happens is they expect the power company to be the police officer to enforce the ordinance and it can't work that way.

PAUL P. ASHWORTH: We have had interference from battery brooders, each with its own thermostat. In one installation there are 60 thermostats and we can't seem to suppress the entire group.

VAN ATTA: We use one condenser across the line at the head of the brooder installation. You might have to blank out each brooder.

(In answer to questions) I believe the long, straight aerial, mounted high, is the best.

We found the so-called "noise free heating pad" just as bad as the other heating pads.

A. VILSTRUP: We shouldn't feel too guilty about this radio trouble. It grew up as a toy in the hands of amateurs. Finally manufacturers turned it into a merchandising business and now it is a public utility. Mr. Van Atta's paper calls attention to the ratio of signal strength to noise level. If there is a proper relation between these two, we get the best results. It is up to the broadcasting industry to put its own house in order. This is not necessarily an electric utility problem.

First Report on Standard Transformers

Presented by MERRILL DEMERIT, representing EEI and COL. A. E. HERZBERG, representing NEMA

(Reporter's Note: Messrs. DeMerit and Herzberg collaborated in presenting with the aid of slides the first report of the EEI-NEMA Joint Committee on Standards for Distribution Transformers, EEI publication No. G-6, NEMA publication No. 106, February 1940. This presentation is not printed herein partly because of the cost of effective presentation and partly because of previous publicity and wide circulation of the report among the engineers.

During the three days of the meeting a display of the new transformer mountings was available for inspection in the hall outside the meeting room.

The printed EEI-NEMA report referred to above has been distributed to the delegates at the meeting. Also available to delegates was the written presentation by Messrs. DeMerit and Herzberg. Several extra copies of the latter report are available for further distribution to members from the secretary's office.

After the presentation on the floor of the meeting, Messrs. DeMerit and Herzberg answered questions as follows.)

DEMERIT (in answer to a question as to the availability of taps on the new transformers): Certain designs in the new standards will not include taps, but taps will be provided at extra cost. No 1½-kva. transformers will have taps. The 2,400-volt transformers up to 25 kva. will not have taps as standard equipment. 7,200-volt transformers below 7½ kva. will not have taps.

In the committee's survey we found that 30% of the companies do not want taps; 40% were buying transformers with taps, but 20% of these would not pay extra for taps.

HERZBERG (in answer to questions as to when the new transformers would be ready for delivery): We originally set a date of July 1, but we found that many manufacturers had stocks of the older standard transformers on hand and these will have to be gotten rid of before the new transformers can be shipped. For the time being, you will have to take what you can get, and this may be part conventional type and part the new standard.

COOPERATION

Cooperation with Accounting Departments

By W. F. MILLER
The Washington Water Power Co.

THE utility business is divided into functional operations, and if we did not cooperate the efficiency of the utility would suffer. We are working toward the successful operation of our companies. We all have the desire to cooperate. If that were all there were to it, there would be nothing more to say. But we don't always know how and when to cooperate. It is necessary to know the problems of other departments in order to cooperate effectively with them.

I should like to define some of the responsibilities of the accounting department. First we must safe-guard the funds of the company, and to do this we must train our men into careful habits in handling these funds. Then we have a responsibility for accuracy in rendering customers bills. Again we are responsible for the accuracy of our property records, and for true and accurate financial reports to stockholders.

In discharging these responsibilities we accountants are perhaps more de-

* An abstract.

pendent on other departments than any other group in the company because our accuracy depends on the accuracy of the records turned in to us.

Capitalizing $1

Suppose we capitalize $1.00 in error. We immediately lose 18c in interest depreciation and Federal tax. We have also increased our real and personal tax value permanently. Further, we have overstated our plant account on the balance sheet and overstated our net earnings for the year. If we finally sell out to someone, we will eventually lose that $1.00.

If the error is in the other direction and we charge $1.00 that should have been capitalized to operation or maintenance, we will gain 18c unless the revenue collector catches up with us, but we will have lost $1.00 from our rate base and lost the right to earn on this. We will then understate our plant account and net earnings, and, if we have to sell, we will have lost our chance to get this $1.00 back.

Its Significance

This indicates the importance of keeping our property values as reflected in our books as accurate as possible and it is just as important to record retirements from property accurately as it is to record original charges to property. In the matter of retiring property, we are particularly dependent on you engineers for proper records. We need the cooperation of all the departments to see that our accounting in all branches reflects the true situation.

Cooperation with Business Departments*

By C. PATRICK JOHNSON
Puget Sound Power & Light Co.

LAST summer, when Ralph Lawlor, chairman of the Accounting and Business Practice Section, Paul Ashworth, chairman of the engineering and Operation Section, and I sat brooding over the problem of more cooperation among the sections of the association and among the departments of our utilities, we found that there were engineers that did not know enough to keep their time slips straight as to whether the work done is for operation or construction, and collectors who did not know enough about appliances to explain high bill complaints. I grieved for both of them until I learned my salesmen were a bunch of high pressure birds who made promises about operating characteristics that no service man could back up and that they downright *lied* about the cost of operation to such an extent that no high bill complaint could be explained. Having found such a complete misunderstanding on the part of the other two chairmen, I suggested that they appear on our Business Development Conference program and show the sales people how their departments were helping us to build load, and we agreed then to exchange speakers with each other at all the Section conferences this year.

Little did I suspect when I invited them to appear on our conference program that they would actually have anything with which to confront me. But after hearing Magnus Crawford, who represented the engineers, and Ralph talk about how their departments were building load, my first inclination was to close up the Sales Department of our company.

Two things prevented my recommending that to our executives First, I thought of the original law—self preservation—I wanted to keep my job. And second, I thought of all the power that is going to be poured into this Northwest territory within the next few years.

Power to Be Sold

On a strictly technical basis, the building of Bonneville and Grand Coulee is an exciting and extremely interesting subject. Coulee outdoes anything ever done before. But—what about disposing of the power? That must be done whether by public or private facilities. We, in the present private companies, want to do that job. It's a big job that can not be done by a particular department of a company. It requires the united work of all the departments of all of the companies.

Our engineering departments must analyze the situation and figure out the best means of intertie and balancing of the loading of the respective systems; our executives have got to study the cost situation; our operating departments have got to worry about distribution facilities; our accounting departments have got to struggle with rate changes and other headaches; *and* the sales departments have got to try to figure out how to get our customers to use this electricity.

Engineers Can Help

Frankly, we in the sales end need your help on the job. There is no need of the other departments working on this situation and obtaining solutions unless we can actually dispose of the kilowatt hours. They must be sold and this can only be done by each of us being a salesman.

I've heard a lot of definitions of salesmen and salesmanship. None of them is satisfactory, but I am sure that we all sense what salesmanship is. Each day we apply it. In our work, we are busy selling ourselves and our companies, by means of our personalities, our knowledge, our ability to serve. And, in our leisure time, we continue to sell. None of us wants anyone to dislike him or his work. Consequently we are constantly selling, whether we know it or not.

New Things to Sell

Now what's this job of selling that we want to do? To sell this volume of power that's coming into this area. How are we going to do it? By showing our customers that *we* are *best* qualified to do the job. *First*, by our contacts with customers. These contacts are made by line extension agents, contract clerks, cut-in crews, meter setters, meter readers, cashiers, collectors, home service girls, merchandise salesmen, service men, farm representatives, local managers, commercial and industrial engineers, right-of-way men, meter testers, and others. They should do their jobs properly and courteously. They should give information on our company. They should turn complaints into a means of selling the customers on our company.

The second part of the job rests with those men who do not contact the customers. They must back up the men in the field in proving that our companies give the best service that can be had.

Our generation, transmission and distribution men must sell the customers on the continuity of our service. Our meter readers and accountants must sell the customers on the accuracy of our bookkeeping. Our service men must sell the customers on the promptness we show in relieving local difficulties. And our collectors and cashiers must sell the customers on the courtesy and pleasant relationship of our company. All of us must constantly do a selling job—selling the customer on our company—selling our company as being the best server of the community that can be had.

But you say that is just your regular job. Why of course it is—but if done well it is also doing a selling job. And if all of the departments are doing a good sales job, no one will have to worry about the disposal of federal power—our companies will get the job—our service will be too good to trust to any other organization.

* An abstract.

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Accent on Responsibility

BOTH opportunity and responsibility were the words used in the theme of the twenty-third annual convention of Pacific Coast Electrical Assn., at Oakland, May 22-24. But the emphasis was chiefly on responsibility. For these are grave times and the electrical industry recognized them as such. It is not easy to visualize opportunities when the next day's dispatches may completely change the order of things.

But of responsibility there was much said and what was said reflected the depth of thought behind it. At the general sessions the opportunity review came from disclosures of progress made in new lighting tools and in the "magic" emanating from the laboratories which finds its useful place in new products or the refinement of old. The opportunity horizon was clarified by speakers who told of the services yet to be rendered the public by employing the results of today's developments.

Seriousness of the industry's responsibilities were felt as speakers told of America's situation in respect to the chaotic and warring world of today. At few conventions since the last war has the responsibility to America itself been voiced so often or so seriously. Coupled with this deep concern over the fate of the nation was the sympathetic understanding of an industry itself under the gunfire of politics for long years and on some fronts under as serious threat of annihilation as some of the nations of the world today.

Committee and section meetings were seriously attended and discussion was keen, interested and in a seeking and eager attitude of mind. The account of the convention in detail within this issue of ELECTRICAL WEST will repay both those who attended and those who could not, if they read it. For therein is an index to the accomplishment, and by whom; a guide to future activity planned that merits support and participation; as well as an inspiration to be picked up inductively from the dynamic convention that it was.

Ready for National Defense

IRRESPECTIVE of the acceleration and pressure put behind the program for national preparedness, the electrical industry here in the Far West stands ready to carry its share of the load. There are ample power supplies available and in prospect to supply any demands for service. And there are facilities ready to deliver power where and when it is needed.

However, there is another aspect to the preparedness picture which is of vital interest to the industry and to the American public as well. W. C. Mullendore, executive vice-president of the Southern California Edison Co., expressed it clearly and concisely in a statement to ELECTRICAL WEST just before this issue went to press. He said:

"The foundation stone of preparedness is a sound national economy and a united people. So-called fifth column activities recognize this because their efforts are directed at dissension and the wasting of resources. Our first line of defense has been weakened because of growing dissension and bitterness between groups of our people. We in the utility business have been the victims of one of these movements. Resources have been wasted by pouring money into unsound and uneconomical projects, along with a determined effort to undermine public confidence in this basic industry. Looking forward to a constructive solution of the national problem, I can think of no better place to start than for the government to change its attitude toward our industry. This change could well be evidenced by the discontinuance of further unsound projects, with a resultant saving of labor, materials and wealth now being squandered, and their diversion to the pressing requirements of preparedness."

Certainly in the fact of an emergency such as confronts this country, there is need for a maximum degree of industrial unity and efficiency. This isn't possible when such an essential industry

as the light and power business is lashed to the whipping post of public scorn by a few bureaucrats who are seemingly opposed to the very principles of private enterprise.

Oregon Says "No!"

THE RESOUNDING "No" delivered to PUD proposals by various Oregon electorates on May 17 should constitute an emphatic local disapproval of developing another TVA in the Pacific Northwest. The campaign in Portland, significant because it was the first attempt to embrace a large metropolitan city in a PUD, was defeated 2½ to 1. Washington County, significant because in the heart of it lies Bonneville's pet municipal "guinea pig," Forest Grove, with rates slightly lower than Portland, also went against a countywide PUD in both cities and rural areas. Yamhill and Lincoln counties followed suit with only scattered small communities and some rural precincts showing a slight favorable majority. Coos County delivered an almost 2 to 1 blow against its PUD in both cities and rural areas. Two cities in Tillamook County refused to annex themselves to the already formed district there. The only success the PUD promoters could point to was a favorable vote in the Nehalem Valley in the Coast Mountains west of Portland, a comparatively poor and lightly populated farming area, and a similar small farming area at Sand Lake, which voted to annex itself to the Tillamook PUD. Final score: seven loud "Noes" to two weak "Yeses."

Effective campaigns by the several private companies involved, and by the Citizens' Committee in Portland, 2,000 strong, who made voluntary contributions for newspaper advertising, radio talks and informative pamphlets, were carried on in the face of tremendous pressure applied by the Federal government through the Bonneville Administration and through the franking privileges of power bloc senators. A case in point was the speech urging formation of the Portland PUD by Harry Kenin (chief PUD promoter in Portland), extended in the Congressional Record by Senator Norris; printed in the government printing office (40,000 copies for $132.14, paid by Kenin); franked to Portland by Senator Norris; stuffed into government printed envelopes and franked through the mails of that city to the citizens. A Portland newspaper man figured the cost of this job, produced in the normal way through regular business channels, would have been $1,560 and his expose of the incident probably cost the PUD more votes among home-rule-loving Portlanders than the relatively unimportant Kenin speech made for it.

Further, the Bonneville Administration, while disclaiming that it was taking sides in local issues, yet pouring through the postoffices of the state under franking privileges tons of mail designed to show the superiority of government over private ownership, likewise created a strong resentment. Evidently the people of Oregon believe in freedom of thought and action and the inalienable right of deciding their own local affairs for themselves, free from coercion applied from 3,000 miles away.

Most obvious conclusion from the election returns is that truly the time has arrived for an intelligent and business-like cooperation between the great Federal developments at Bonneville and Grand Coulee and the private utility companies in the electrically progressive Northwest. The private companies have consistently offered this cooperation and the time has apparently come when the Federal government can accept this offer with good grace—particularly in view of the recent focus of attention on national defense. In fact the pronouncement of Dr. Paul J. Raver in Washington just as we go to press, that the transmission network of the Bonneville Administration is planned to be integrated with the networks of the existing private utilities in the area, is a statesmanlike step toward effective cooperation.

Certainly the people of Oregon have spoken. They have expressed themselves emphatically in favor of a continuation of free enterprise—of the American Way. Now let the Federal government, through its administrative officers charged with operating its power plants in the Pacific Northwest, practice what it has heretofore preached about abiding by the will of the people, and cease its campaign to destroy the private utility enterprises in that region.

Small-Diameter Wire

WITH 75 per cent of the commercial structures erected prior to 1930 woefully lacking in electrical adequacy, the advent of small-diameter building wire has brought the electrical industry a new approach to a tremendous market. Four different types of small-diameter wire will be recognized in the 1940 NEC. With these wires copper capacity in existing conduits can be more than doubled for only a fraction of the expense that a complete re-wiring job would cost. Experience in those communities where inspection authorities have been permitting trial installations of these new materials shows that building owners and managers can be approached withe concrete proposals for re-wiring and re-lighting on terms which are attractive. However, the mere availability of these new materials does not mean that there will be a flood of orders. Aggressive selling based upon a sound knowledge of the new materials will be required to win this potential business.

LIGHT MINDED were all who attended the conference, and among them were (7) Burdette Moody, Bureau of Power & Light, R. W. Sorensen, Cal-Tech and AIEE, Lester Graves, president of IES; (8) Dr. Leland Brown of Stanford and A. W. Ray, Sausalito schools; (9) Leonard Hobbs, chairman San Francisco Section, and H. Weill, Incandescent Supply; (10) Tom McDonough, Central Arizona Lt. & P., and Ted Shepherd, Bureau of Power & Light; (11) President Graves, Morris Hixson, General Electric Lamp Dept., and Herbert Mayo, Smoot-Holman, San Francisco

First IES Conference

SUCCESSFUL in its own light the very first regional conference of the Illuminating Engineering Society, held in the Edison auditorium, Los Angeles, April 26-7, started the venerable IES on a new precedent. But it did more than set standards of attendance and participation. It presented a compact, well engineered, well-timed program of practical working information to the lighting men of the West that will be reflected in every phase of lighting. Registration reached a surprising total of 406, attendance at one meeting overflowed the auditorium and adjacent rooms with more than 600, including students from nearby universities, and yet the program went on exact schedule and closed on time.

This latter achievement was because of the good-humored management of Frank Hansen, director of Western Institute of Light and Vision, as general chairman, and the well coordinated assistance of local committees, George M. Rankin, Southern California Edison Co., attendance; Herbert J. Mayo, Smoot-Holman Co., entertainment; Urban L. Beh, General Electric Supply Co., golf; Henry B. May, Jr., G-E Co., tickets and conference papers; Dr. Leland H. Brown, Stanford University, papers presented, and Leonard A. Hobbs, Smoot-Holman Co., San Francisco, San Francisco Bay Section committee.

Lester H. Graves, president of IES, came from New York City to give the conference his support. It had been his idea and a part of the program for his administrative year to initiate such regional conferences. The Los Angeles conference, promised last year, was the first, even anticipating the constitutional change in the IES bylaws setting up the new regional divisions. President Graves addressed the conference at a special luncheon at the Biltmore, Friday noon, attended by Mayor Bowron and what Hansen termed the "ranking generals" of the industry and Los Angeles business life.

Separate sessions were presided over by Henry B. May, Jr., chairman of the Los Angeles Section, IES, exterior illumination, Friday morning; Nathan H. Graves, chairman of the San Francisco Bay Section, exterior illumination, Friday afternoon; and George M. Rankin, the Lighting Sales conference, Saturday morning.

Appropriately a form of lighting which sprang from Hollywood movie premieres, spectacular or "ballyhoo" lighting, was discussed to open the conference. Ted Shepherd, director of lighting, Los Angeles Bureau of Power & Light, after tracing its origins with an automobile dealer and Otto K. Olesen, told of its use now to open in a blaze of glory everything from a hot dog stand to a super-market. He illustrated the equipment employed, and said that a taste of flood lighting, followed by a lack of it, often resulted in permanent installations of lighting equipment.

That safety lighting saves lives when intelligently planned according to an analysis of accident records, was demonstrated by Melvin J. Bankhead, traffic signal engineer of Los Angeles county. He explained that county's geographical traffic accident recording system by which the facts can be ascertained and scientific correction applied to the cause. Illumination is closely allied with the general problem of traffic movement and control. Yet 61% of the 1939 traffic fatalities in the unincorporated areas of the county happen after dark, 69% of all pedestrial deaths after dark. He warned, however, that remedies must be based on factual analyses and that the industry must subordinate the sale of equipment and power to the real goal of safety.

Another popular use of light highly developed in the West, lighting for outdoor play, particularly around the average home, was reviewed by Arthur M. Johnson, district engineer, S & M Lamp Co., Los Angeles. Larger playgrounds, bigger audiences, faster play have brought demand for increased illumination, he said. He also differentiated between lighting where spactators are to watch and light for night play alone, the former requiring far more intensity.

"Spectrum of Light 3 Ringer Shows, Inc." was the fluorescent sign over Alston Rodgers, division engineer, South Pacific District, Lamp Dept., G-E, under which he raced through a demonstration and explanation of new light sources, equipment, fixtures and lab-

Blazes New Trail

oratory novelties from several manufacturers. With all the flare of a magic show this swift review nevertheless illustrated possibilities for application of the new lighting devices thus demonstrated.

Where grocery customers wait on themselves, the illumination on all merchandise must be planned in such a way as to place a maximum on the vertical plane. This was the conclusion of George Gilleard, illumination scholarship student, Stanford University, following a special study of the problem. Difficulty in finding standard equipment to do this effectively is one unsolved problem as yet, he concluded.

In the nature of a "catching up" was the review of progress in fluorescent lighting sources and equipment and applications given by Francis M. Falge, illuminating engineer, G-E Lamp Division. Higher efficiencies, lower costs, better color, power factor correction in the new auxiliaries, replaceable switches and standardized fixtures signify that the "bugs" have been removed. Now that the novelty has also worn off, applications are beginning to be directed toward high illumination levels now possible.

How the utility looks upon fluorescent and gaseous source lighting was covered by William P. Bear, Pacific Gas and Electric Co., San Francisco, at the Saturday session. His paper was a follow-up of a previous study, "The Cost of Light From Modern Sources," (see ELECTRICAL WEST, May 1939, p. 47). The importance of power factor correction he analysed thoroughly, showing that in addition to twice the investment in conductor and generator capacity to serve 50% power factor customers the utility has to carry extra burdens of I^2R losses in transmission. He also showed the importance of applying correction at the lamp instead of the panelboard so that charged condensers will not be floating on the line to create a potential hazard even though the lighting is turned off.

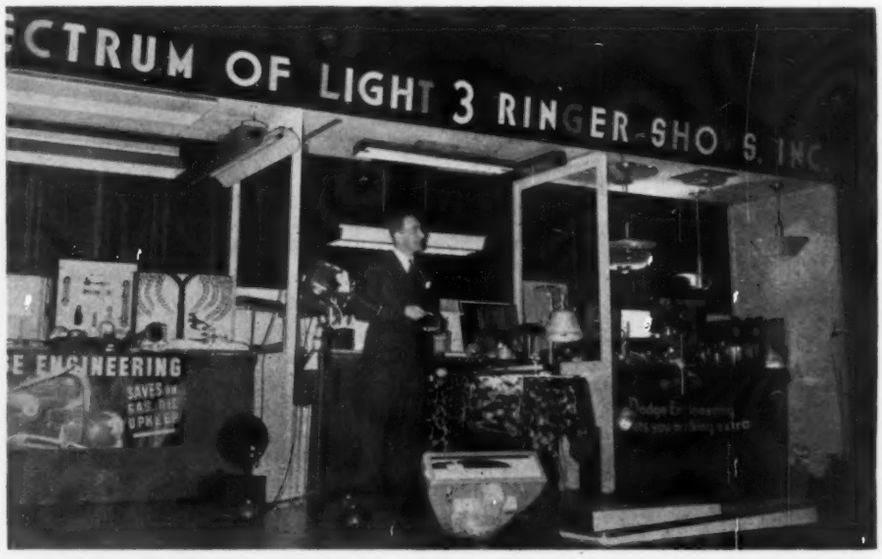
School lighting problems were the subject of four papers. First was one describing attempts of some California school architects and authorities to make fullest use of daylight. Functional single story modern schools in the San Joaquin valley have been a proving ground. Dr. Leland H. Brown, Stanford University, reported observations as to the efficacy of such daylighting control systems, studied by a committee of the Sight Conservation Council of Northern California.

Leonard Hobbs, San Francisco district engineer, Smoot-Holman Co., presented the case for artificial lighting of schoolrooms. He estimated its value in improved scholarship based upon experiences of commercial establishments which had increased the efficiency of employees by improved lighting. He also estimated the cost of installation and operation of a satisfactory school room lighting system.

A. I. Benedict, illuminating engineer, San Diego Consolidated Gas & Electric Co., contributed to the discussion the results of experiences in his territory in bringing information to the public and to school authorities. He maintained that if schools often give free milk to undernourished children it is logical for them to provide enough light for all children to see without strain.

It was A. W. Ray, superintendent of schools, Sausalito, and an experimenter and researchist in lighting in his own right who clarified the entire school lighting controversy. By giving voice to "the educator's viewpoint in school lighting" he illustrated by photographs that the control of relative brightness between highly contrasting surfaces within the view of children in a classroom was more important than providing just more light. Sunlight, a bright sky, clouds, a bright reflecting wall outside the windows, too bright a ceiling from indirect lighting, in contrast to dark boards, furniture, shadows in the school room call for too great eye adjustment. Lighting, he said, must be coordinated to other factors, such as paint, color, chalkboards, so that brightness contrast, which he emphasized as a relative *sensation*, may be kept within tolerable limits.

While the sightmeter has made possible great improvement in lighting in stores and offices, the quarters of the professional man still remain of the dark ages, said Foster K. Sampson, architectural illuminating engineer, Southern California Edison Co. Most novel of recent experiments was described as a "ladder" of fluorescent tubes across a window in a dentist's office, which with a 750-watt indirect ceiling unit, furnished ample light for the dentist without spotlighting.



Alston Rodgers of G-E Lamp Division and his rapid fire demonstration of new lighting materials, fixtures, equipment, stunts from all manufacturers

Tendency of cities to decentralize into many shopping districts has given an opportunity to relight and modernize whole districts. A paper by Lloyd A. Gates and Oscar W. Meissner, illumination section, Los Angeles Bureau Power & Light, told how such mass relighting of districts can be stimulated.

Harry N. Carroll, manager of commercial and industrial sales, PG and E, San Francisco, closed the conference with an inspiring picture of "Western Lighting Opportunities," and a challenge to illuminating engineers to protect the public and the industry by sound advice. The public, he said, is confused by the conflicting stories of those who have flocked to make fixtures of the new light sources with no more equipment than a pair of tin snips and a soldering iron.

PCEA Convention

Oakland sessions, with record attendance, learn of electrical industry's opportunities and responsibilities

CONGRATULATIONS—President W. W. Glosser wishes President-elect C. E. Houston a successful administration during the forthcoming PCEA fiscal year

THAT MANIFOLD opportunities exist both for the industry and the individuals in, but that these opportunities carry with them definite responsibilities, was emphasized by speaker after speaker at the 1940 PCEA convention held at the Hotel Oakland, May 22-24. From the opening address by President W. W. Glosser to the last lighting effect demonstrated by Westinghouse's Samuel G. Hibben, the 675 who registered were impressed by optimistic messages of opportunities that lie ahead and by pleas for the exercise of stauncher citizenship.

Those attending were enthusiastic in their praise of the well balanced and correlated mixture of business and entertainment provided by Hubbard's Harold Noack, general convention chairman, and his capable corps of committees. Speakers from outside the industry shared equally with industry representatives in bringing messages of vital import in view of the national and international emergencies.

"The fact that all of you are working in this great industry," President Glosser said in his annual address, "proves that each of you thinks that it holds forth rewards in the form of a stable and secure livelihood with definite opportunities for growth and advancement. We know that in the 50 years of our industry's brief life it has become inseparably geared to American life and progress. Yet we know that if all of our customers used up to the full limit of the possibilities developed by our research, the business of every unit in every branch of the industry would be doubled or trebled. As workers in a great industry all of us have certain responsibilities. The most important of these is to see that our industry has solidarity, stability and respectability."

With this as a theme other speakers brought out forcibly the fields in which opportunities exist and emphasized some of the responsibilities of the industry as well as those of the individuals, particularly as regards good citizenship. The convention combined two half day sessions of conclave meetings under the direction of the three sections of the association. These small group meetings covered the whole gamut of engineering, business development and administrative subjects and were exceptionally well attended. In the pages that follow will be found abstracts of some of the major addresses, reports on others and resumes of the group deliberations.

Tomorrow's Kw.

A platform for cooperation in marketing federal power

By J. E. E. ROYER*
President, Northwest Electric Light & Power Assn.

THE DEMOCRACY that we know as the United States of America is founded upon the principle of freedom —with each man entitled to life, liberty and the pursuit of happiness. Free enterprise—private enterprise—is the cornerstone of our nation. Upon that cornerstone there has been built a civilization that ranks above the world. As the result of untrammeled thought, imagination and ingenuity, Americans have been free to create a standard of living that is the envy of the world. What label can we place, therefore, on those who denounce private enterprise and seek to spread the paralyzing influence of bureaucracy?

The electric service industry is a typical example of private enterprise. It had its beginnings in the inventive genius of Americans. It was enabled to grow and develop because farsighted individuals pooled their resources to furnish the necessary capital. Today the private utility is a citizen of every community it serves. The furnishing of electric service is only one of its responsibilities. It plays an important part, in addition, in the betterment of the community. It provides payrolls and through free competition and adequate reward encourages every employee to better his position.

In these times when great nations are locked in a battle on the question of democracy versus dictatorship, it behooves Americans to inquire if their own democratic institutions are being preserved from aggression. The threat to the existence of private enterprise in this country implies threats of even greater significance to the people of the nation.

The welfare of the private utliity is necessary to this nation at his time for two reasons. First, the principle of private enterprise is closely linked with the democratic principles of our nation. Second, the private utilities play a most important part in our scheme of national defense.

Adequate and reliable electric service is as important in national defense as arms and ammunition, because it is so vital to our industries and to our communications. In modern warfare, we know that power plants and transmission lines become military objectives whose destruction would paralyze the forces of defense. Consideration of this factor points to the value of the numerous generating plants and the looped transmission networks of the private utilities so that in the event some destruction is accomplished by an invader, such destruction is necessarily partial and the entire system is not affected.

In the Pacific Northwest there are today 261 generating stations and 15,283 mi. of transmission lines. These have a capacity of two and a quarter million kw. which is well above the normal demand of the territory. They are spread out over five states from the Coast area well into the interior.

The Bonneville and Grand Coulee projects wil have a capacity of 2,322,000 kw. Both are located on the Columbia River within an easy reach of the

coast line from which an invader might launch an attack. An invading aerial squadron swinging inland could destroy these gigantic plants with a couple of bombs on single trip. It is obvious, therefore, that to rely upon the capacities of Bonneville or Grand Coulee is to court disaster from the standpoint of national defense. The interconnected systems of the private utilities of the Pacific Northwest are admirably suited to any plan of national defense; therefore, their welfare should be the concern of everyone.

The Bonneville and Grand Coulee projects are here to stay. Their justification is no longer open argument. The vanguard of tomorrow's kilowatts is already rolling off the generators at Bonneville. Bonneville power and Grand Coulee power must be sold. The hundreds of millions of dollars which have been poured into these projects were not the government's money—they were the taxpayers' money. And it cannot be allowed to go to waste. Somehow and as rapidly as possible, the interest and the principal amount of this money must be returned to the taxpayers.

The managements of the private utilities in the Pacific Northwest realize this fact and are sensible of an obligation, arising from their association in the industry, to assist in the marketing of tomorrow's kilowatts. As our contribution toward the solution of this problem —and to aid also in the solution of the even greater problem of national defense—we offer a program of cooperation and coordination. The advantages of such a program as opposed to duplication and competition are apparent to everyone. It is in the public interests because it eliminates the waste and inefficiency which inevitably results from destructive competition.

A program based on the principle of cooperation will eliminate the unnecessary and expensive duplication of transmission facilities, permit the coordination of power resources to meet load requirements and permit the use of the displacement method of transmitting power which has proved so economical in actual practice. It will save immediate expenditures by the Federal government of millions of dollars for unnecessary transmission lines—these funds are desperately needed at this very moment for the greater emergency of national defense.

A program of cooperation and coordination will provide additional outlets for the earliest possible sale of Bonneville power through existing first-class private utility transmission and distribution systems which have well-trained sales organizations whose capabilities at building loads rapidly have been demonstrated over a period of years. It will provide almost immediately facilities for delivering Bonneville power to all available markets, instead of these markets having to await completion of unnecessary, duplicating lines before receiving such power. Again it will reduce the cost to the public, for the public must eventually pay for the cost of transmission lines whether the power is distributed by public or private agencies. The construction of a superimposed independent transmission system by Bonneville places a lien, totally unnecessary, on every electric outlet in the Pacific Northwest.

Another and very important outcome of such a plan would be the withdrawal of a very serious threat to the tax situation, particularly in the states of Washington and Oregon. The millions of dollars which the private utilities are now paying for federal, state and local school purposes represent a very tangible contribution toward the cost of government, national defense and education. The loss of these tax payments would be felt heavily in every county in those states and would have to be replaced by additional taxes on the remaining taxpayers. Such an eventuality would have a definite repercussion on the efforts of the communities of those states to attract new industries, because the tax situation is an important factor in the location of factories.

What are the chances of attracting huge industrial customers to absorb federal kilowatts? Everyone is familiar with the fact that the cost of power, already being low, is not a controlling major factor even in the location of such industries as the electro-chemical or electro-metallurgical, which use large amounts of power. And as far as the average manufacturing establishment is concerned, the cost of power is less than 2 per cent of the cost of the product manufactured. We cannot expect, therefore, any great exodus of factories from the industrial sections of the East and migration to the Pacific Northwest.

If cheap power is such an irresistable lure to factories, what has happened in the TVA territory? Surely we can expect to find the answer in that land of the market yardstick! The answer is there. We find the following dollar value of industrial plants located in some of the southern states in 1938: Tennessee, the TVA area, industries valued at $458,000 moved in in that year. But in the same year South Carolina secured $1,544,000 of new factories; North Carolina, $9,335,000; Louisiana, $12,817,000; Georgia, $5,799,000; Virginia, $26,939,000. Tennessee stood at the very bottom of the list of southern states in the value of new industries located in 1938.

Whichever way we turn we come back upon the one solution for the utilization of tomorrow's kilowatts—they must be sold. Private utilities are equipped to do that selling job and they have pledged themselves to undertake the task and to pass on any savings to their customers. In this way only will the legitimate objectives of these federal projects — cheap power — be attained. It will be attained on a sensible basis without disruption of tax situation, without menace to national defense, and with a minimum of expense to this generation and to future generations.

"More Light"

Brewster Adams asks and answers some pertinent questions

"IT ISN'T what you think about yourself, it's what the public thinks about you," Brewster Adams, noted Nevada minister and journalist, told the convention in his address "More Light." "Where would the people in your industry be for a job if it wasn't for the sufferance of the public?" he asked.

SMILES—Dr. H. B. Walker, chairman of the California CREA (left), smiles with A. M. Frost, PG and E manager of agricultural power sales (center). J. E. E. Royer, president of the Northwest Electric Light & Power Assn. (right), not only enjoyed the convention, but also told those in attendance about problems of the utilities in Oregon and Washington

Dr. Adams then went on to point out that the greatest enemy in the world is darkness and that darkness is worse within the hearts and minds of men. People are suffering from a mental blackout, he said, with fear and confusion in their hearts. "We cannot let the inner light be snuffed out," he declared, " when the individual—the common man—is the hope of your business, our country and the whole world."

"When you put out the light of initiative in a man or a woman with a dole," he stated, "you take away his most precious asset. We not only need light but we need vision. We have thought of volume and have forgotten vision. We have thought of output and have overlooked insight."

In outlining a sales philosophy, Dr. Adams declared that if the electrical industry represented supply then the American public represented demand. The capacity to absorb can only come from quickening of the desires of people for things which the industry has to sell. Only by selling the answer to some desire will electric goods be sold. Progress in this industry or any other won't come from the industry alone but only as public desire will absorb its products.

He urged that the industry give more time to studying people with the idea of learning to make friends. Confidence of the public can only be won by earning it, he stated. If this civilization is not to perish from the earth, he declared that every individual must do his part to keep alive the light of democracy, the light of initiative, the light of enterprise, of opportunity, of fact-finding and of honesty.

RATES AND REVENUES—W. G. Vincent (left) vice-president and executive engineer, and J. S. Moulton, rate engineer, Pacific Gas and Electric Co. liked the convention as did J. P. Dayton, Sierra Pacific Power Co., treasurer (right), who headed a large Reno delegation

Accomplishments

What the electric utilities have done for California and the nation

By C. W. KELLOGG*
President, Edison Electric Institute

IT IS MY PURPOSE to consider a few of the elements of community value contributed by the largest electric utility system in your state. In singling out this utility for an enumeration, I am taking it as a shining example. It is simply a picture of what well managed utilities have done for their communities.

Let us consider first values arising from consolidation and financing. This present large system represents the consolidation of about 450 former separate public utility companies. Their combination into one entity means the elimination of a substantial part of the overhead charges of each of these hundreds of individual properties. It represents also the manufacturing of the huge aggregate of energy requirements in the most efficient generating stations and their interconnection through a network of transmission lines that now gives to each service area large or small a flexibility and dependability of supply.

One of the most striking results of this great consolidaiton is in the realm of finance. Even since 1930 the entire structure of bonds and mortgages has been simplified by reducing the number of underlying mortgages from 34 to 2 (both of the latter being noncallable) thus resulting in one broad bond coverage. The many issues of preferred stocks have been condensed down to one issue and the same is true of common stocks. In the process the further fundamental improvement has been made of reducing bonded debt from 51 per cent to 46 per cent of total capitalization and surplus and of increasing the common stock and surplus from 28 per cent to 33 per cent of that total. The value of this to the 3,000,000 people served in lower cost of capital and assured ability to raise capital for the future is a community asset of great moment.

Another important public value is its ability to absorb the power output from the great public developments of this region for irrigation and water supply.

In California irrigation is a matter of primary concern. The state's largest utility company has met this condition by the most intensive development of lines to serve the agricultural sections, no less than 40,000 pumping plants on individual farms being energized from its electric service. Combined with a pumping installation inspection service and the regular issue of a Ground Water Level Map, this has been of enormous benefit to the farmers of the state.

I wonder if the people of this region appreciate what a wonderful asset, as a developing force to build up industry, commerce and the means of gaining an adequate livelihood, to foster the building and enlarging of prosperous, healthy residential areas and to increase public revenues to support good government, is the initiative and commercial pressure and drive of an alert and able electric utility.

Some of the most important values, like dependability of service, absorption of public power and the attraction of low cost reliable power for industry, are difficult to evaluate in dollars; but the definite savings from rate reductions (passing on economies to the public) and financial strength can be conservatively estimated at over $20,000,000 per annum, or about 3 per cent on the capitalization,—an amount equal to nearly 60 per cent of the amount earned by the company itself on its investment.

While contributing by its activities and development so bountifully to the community welfare, the company was also the largest taxpayer in the state of California, paying to the public in taxes about three-fourths as much as to all of its employees in payroll. Unlike the government projects of recent years, here is no case of huge sums taken from the taxpayers without payment of interest or taxes thereon, no case of allocating major portions of the expenditures to other purposes, on the theory that if they are not charged against a project, they somehow don't exist. In the case of our company, the public benefits were conferred without deduction of any kind, while the company raised all the necessary funds on its own credit and, instead of being a tax eater, was the largest taxpayer in the state.

The communities of California are to be congratulated upon the great public asset their electric utilities have proven to be, for these utilities have to their credit a great job well done. They were never better armed than they are today with the high purposes, com-

* Abstract of a speech read by P. M. Downing.

SAN DIEGO TO RENO—San Diego Consolidated Gas & Electric Co. was well represented by (left to right) G. H. P. Dellman, Alfred May and K. B. Ayres along with others while Frank Tracy (right), Sierra Pacific assistant manager, was another of the Reno delegates

petent organization, managerial and technical skill, commercial acuteness and financial strength required to serve adequately this great commonwealth of people.

Glamour

Mrs. Louise Watkins describes wherein business has it

AMERICAN business and industry has a lot of glamour attached to it but it has not let the public in on the secret, Mrs. Louise Ward Watkins told the convention audience at a luncheon Wednesday, speaking on the subject of "Glamour." Mrs. Watkins, wife of the purchasing agent of the Southern California Edison Co. and daughter of the late George C. Ward, Edison Company executive, is active in women's work in civic and governmental affairs and in Americanism throughout the country.

"Working in American business today is the most glamorous of all occupations that have engaged mankind," she said. "Without the American businessmen, there would have been no industrial expansion, no high standard of living and very little culture."

Mrs. Watkins stated that there was a time when it was not fashionable to be patriotic but that today it is obvious that this conception is entirely wrong. With the present turmoil confronting the world, Americanism, she said, should receive more than mere lip service.

She described both the so-called "realists" and the critics of American business and industry. She said that critics should be put on a lower plane than the men who create. "Critics rise, lash, destroy and are gone," she declared. "Those who create live by their great works. The successful businessman is a practical realist. He doesn't go about the country making speeches but devotes his time to making life better for the people of this country. The American businessman is the real glamour boy behind the scenes who is responsible for most of the American culture."

Defining Americanism, she stated that it means wider horizons, enlarged opportunity and freedom to work, to live, to speak and to worship. There should be only one yardstick and it should apply equally to business and to politics she said. This is the welfare of the people of the United States.

"We unfortunately live in a world that pays homage to those who speak out for themselves," she stated. "It is time for businessmen to speak out and let the public know that they are the ones who give the real glamour to life in America."

Crossroads

Tribune's Knowland talks about U. S. lack of preparedness

REFERENCES to events in Europe were frequent but no convention speaker did a better job of relating these to the American scene than Joseph R. Knowland, publisher of the *Oakland Tribune* and former Congressman, in his convention luncheon address, "America at the Crossroads." Echoing popular opinion that it would be a miracle if America did not become involved, Knowland claimed that a mighty world force—ruthless, indifferent to promises — menaces all democratic institutions.

In answer to the question "How America can become involved?" he gave as his opinion that there is little danger of invasion of the United States. The real danger, he stated, lies in enforcement of the Monroe Doctrine, in the protection of the Panama Canal, the Philippines and Hawaii and in backing up statements made by the administration with reference to interference or invasion in Canada and the Dutch East Indies. He declared also that there were sore spots in the Western Hemisphere where fifth column activities and other local situations require constant watching.

"Public opinion is heartily in favor of the preparedness program laid down by Congress," he said. "Everyone has been startled by our unpreparedness. Apparently our planes are obsolete, we are shy of guns, ammunition and manpower."

Pointing to the six billion dollars appropriated during the last seven years for national defense, he asked the cryptic question "What have we got for our money?" A comparison of naval armament for 1933 and 1940 showed 15 battleships in each year; three aircraft carriers in 1933 and five in 1940; eleven heavy cruisers and ten light cruisers seven years ago and 18 and 17 respectively today; a decrease in the number of destroyers from 229 to 219 and an increase in the number of submarines from 82 to 95. In the last three years he said that $1,237,000,000 had been appropriated for the Army and only $117,000,000 or slightly more than 9 per cent spent for new equipment. He urged that the citizenry insist that partisan politics be removed from national defense and preparedness. The nation should insist on an accounting of such huge expenditures, he declared.

CHIEFS—There were plenty of executives in attendance. Here are J. B. Black, P. G. & E. president, and Harry J. Bauer, president of Southern California Edison Co.

"In the present emergency, the public should demand that the United States be ready for any eventuality," he stated. "We have a fifth column in the country for which every citizen must be alert. There should be a forcible declaration that we in this country will not tolerate insidious forces. As a citizen of the greatest democracy in the world, I feel that we should do everything in our power to aid the Allies short of joining the war."

DIRECTORS—All-industry character of PCEA is illustrated by this group of directors: (top) K. M. Ryals, vice-president of Stone-Ryals Elec. & Mfg. Co., and M. H. Jankelson, general manager of Incandescent Supply Co. Below are H. L. Harper, Pacific Southwest manager of Graybar and D. E. Harris, vice-president of General Electric Suply Corp.

At this luncheon, recognition was accorded the past president of the association by the presentation of certificates of appreciation from the association. Al C. Joy, who presided, gave certificates to past presidents A. Emory Wishon, L. H. Newbert, James B. Black, P. M. Downing, W. L. Lewis Frost, F. O. Dolson, W. C. Mullendore, R. E. Fisher and A. E. Hitchner.

Opportunities

Survey of the past shows what lies ahead for the industry

By M. O. TROY*
Commercial Vice-president, General Electric Co.

ONE of the disturbing effects of the rapid growth in our industry has been that its very success, in combination with state and Federal regulation, has made the light and power business a political football. I am not using the term "political football" in any opprobrious sense. I am merely indicating the indisputable fact that any rapidly growing successful industry of national scope inherently must face this problem.

* An abstract.

Perhaps the pendulum has swung too far. Be that as it may, we cannot escape the exercise of Federal regulation. We should, however, do everything within our power to see that the Federal right is most wisely exercised in the interest of the industry and of the entire country.

Day by day, it is becoming increasingly more difficult for those engaged in the power and light business to extract a reasonable profit from their operations. Regardless of the economic truth that all our advancement has come through providing incentives for effort and endeavor—and that future progress will not flow from red ink—increased taxes and great reductions in rates now make it extremely difficult to show a fair "net" at the end of the year.

In the past, the leading electrical manufacturing companies, working hand-in-hand with the central station companies, have brought to the industry new and improved products for the generation, transmission and utilization of electric power.

New load-consuming devices, more efficient and more reliable power apparatus, and improved methods of manufacture have been instrumental in enabling the utilities to meet the challenge of higher taxes and lower rates. The co-operation we have had in the past, and which we will have in the future, will help us to cope more successfully with the new order.

In the wide field of load-building, or power utilization equipment, I will mention only two products. First, lamps, as an example of the earliest type of load; and second, household refrigerators as representative of a more recent load-builder. Both are startling examples of progress.

The early Edison lamp cost $3. Today, a 100-watt lamps costs only 15c, and gives ten times the light. Stated another way, the modern lamp, at one-twentieth the cost of the Edison lamp, gives ten times the light. This represents an over-all improvement of 200 times. And all this is in addition to the greater durability and longer life found in the modern lamp. Lamp research and development have made possible to the American public today a saving of some two billion dollars a year for the light they use.

Outstanding among new light sources is the fluorescent lamp. It offers industry an efficient source of daylight lighting that permits objects to be seen in their true colors. This benefit can be obtained with less heat than possible before, because the fluorescent lamp radiates only one-fourth as much heat as an incandescent lamp of equal units of light. It is designed to contribute new qualities to lighting, rather than to replace older equipment.

Lamps are now used in a multitude of drying processes. Infrared rays will dry synthetic enamels and lacquers in from 5 to 15 per cent of the time formerly required. Infrared lamps have a valuable penetrating quality so that painted surfaces dry from the inside out. The automobile industry, which pioneered their use for drying bodies, now uses some 40,000 of them. They have untouched applications in other industries, such as the drying of ink, paper, blueprints, resin, and latex.

Ultraviolet light is finding new industrial uses daily. Progressive laundries have found that choice fabrics, which might be marred by coding in ink, can be marked with fluorescent materials invisible to the human eye, but readily seen in the presence of ultraviolet light. Rugs for the aisles of theaters have been decorated with fluorescent material, so that this same invisible light will assist a patron to his seat.

Ultraviolet light in special wave lengths has a germicidal property which opens up many new applications. Among these are uses in sterilizing utensils, hospital operating rooms, food processing operations, and in purifying the air in conditioning systems.

Possibilities in lighting, our oldest load builder, are still a long way from saturation. We are still operating on starvation levels as far as the great majority of our homes, streets, places of work, and business establishments are concerned.

Only 15 years ago, in 1925, the household refrigeration industry was in its infancy, struggling for existence. A total of only about 75,000 units had been sold up to that time. The immediate future was anything but promising. Costs were high, and reliability was poor. Constant service was necessary to keep the units operating. The improvement in each item of unit and cabinet construction kept pace, so that in a few short years the refrigerator rose from the status of an expensive, irritating luxury, into a low-cost household necessity. The average retail price of $600 in 1920, came down to $275 by 1930, and, last year, averaged only $168.

Sales quickly followed product improvement and price reduction. By 1930 more than two million household refrigerators had been sold. In the period from 1930 to 1940 almost 15 million more were sold. Allowing for replacements, there are now about 14 million household refrigerators in use in the United States. They account for an annual load of more than five billion kw.-hr. per year. This horizon is not closed. Forty-four per cent of our homes are still without the benefits of electric refrigeration.

What effect have the great improvements in power apparatus and appliances had on the load? What are the future prospects for load? Since the sum of the domestic and industrial loads comprises 70 per cent of the total kw.-hr. sold, an analysis of their behavior in the past may give us an insight into future possibilities.

If the domestic load is plotted by years, so that we have from 10 to 20 past years to inspect, it is very gratifying to note that instead of showing any signs of saturation, it shows a decided long-time acceleration. If the residential load should continue the same rate of growth it has exhibited during the last 14 years, it would double its 1939 value of 21 billion kw.-hr. in about eight years.

Power in American industry, about one-half of which is purchased from electric central stations, is now nearly 300 per cent of what it was 30 years ago. During the same period, the volume of production has almost doubled, and wages paid have increased more than threefold. By increasing the amount that each worker can produce, the power-driven machine has made it possible for the average American worker to earn at present nearly twice the weekly wages he received in 1914, while his average working week was reduced about 25 per cent during the same period.

I, for one, am convinced that we have only scratched the surface of possible uses of electric power in industry.

Rural Loadbuilding

Research reveals opportunities and responsibilities

By H. B. WALKER
Chairman, California CREA

CALIFORNIA has long enjoyed leadership in rural electrification. Naturally, we are proud of the fact that practically all of our occupied farm homes enjoy the advantages of electricity and that the average annual consumption in kw.-hr. per farm is unsurpassed by any state in the nation. Environmental factors, it must be admitted, have been favorable for rural electrical development but many of the opportunities for logical rural service development have been aided by timely research.

It would be unfair to assert that research in rural electrification has been solely responsible for our leadership in serving farm customers in California, because 16 years ago before our cooperative CREA research programs were initiated, electric service had already reached more than 30,000 California farm homes. But today, after these years of rural electrical research, power lines serve more than four times as many farms as in 1924 and many of these services are for purposes unthought of a decade or more ago. In these matters of load building, research has been particularly helpful in showing the way to new load building opportunities, and in defining the attendant responsibilities connected with farm service.

While it has been a general policy of the California CREA to encourage studies of applications which show the greatest promise for load building, such as for example our well-known studies of electrical applications to dairying, poultry production, dehydration of fruits and nuts, pre-cooling of fruits and vegetables and the control of insects by light, it has not been possible to confine our investigations always to such interesting and profitable subjects, since on occasion other types of investigations have been necessary to determine, factually, the effects of such things as current interruptions, electric shocks, light qualities as incidental projects to determine responsibilities in offering service. For example, early in our researches, studies were made of electrical incubation of chicks, which brings electrical energy into competition with other energy sources. Naturally the question of current interruptions was brought up as an important disadvantage to this type of energy. If the interruptions to service were serious, the convenience and practicability of electric incubators could be seriously questioned. To be able to answer this question, it was essential to set up an electrical incubation experiment in which chick embryos were exposed to chilling from current interruption.

The results of this study are perhaps typical of the mutual benefits to consumers and utilities alike coming from our research programs. In this particular instance, users of electric incubators were reassured as to the dependability of the service and equipment, while the utilities now feel justified in building up an incubation load without fear of losses from damage claims due to ordinary current interruptions. Incidentally, it may be pointed out that such investigations require a type of research which the utilities within themselves are unable to carry out.

No less than eight projects on the application of electricity to the production, storage and processing of milk and milk products have been conducted. Dairying is still one of our most attractive fields for farm electrical service. When one considers that our public health regulations make it necessary to handle this product in a highly sanitary way, including cooling, refrigeration, sterilization of equipment, water for washing barns, cows, equipment and for drinking, as well as lights, equipment for feed preparation, etc., it is not difficult to imagine that a potential dairy load of 200 kw.-hr. per cow per year is within reason. California has more than 600,000 producing dairy cows. At present less than half of this load is actually developed. It must be remembered, however, in this connection that the first electrical applications are the easiest.

Dehydration of agricultural products opens up a vast opportunity for electric applications for heat, light and power. In most installations electric energy for power and light is a matter of course but in heat applications, highly competitive conditions prevail. Studies are now under way with the objective of finding better ways to dehydrate artificially certain of our fruits on a farm plant basis. It is difficult to forecast just what developments of this sort will eventually mean to the electrical industry as a load builder or to agriculture in terms of net profits. If we actually knew, there would be no need for research. It is apparent, however, if farm practices can be improved, the economic status of rural customers should follow and this should be reflected in rural load building.

It has been emphasized that care and caution in farm load building, par-

ENERGIZERS—M. L. Phillips (top right), Edison Visalia manager, is chairman of the Administrative Services Section, S. E. Gates, G-E Los Angeles manager, heads the membership committee. Below are Frank C. Angle, Allis-Chalmers, who staged the cocktail party, and Fred Mulvaney, Maydwell & Hartzell, who arranged the ladies' entertainment

BUSINESS BUILDERS—Here are (left to right) Frank Talcott, PG and E San Francisco division sales manager; H. W. Edmund, Coast Counties Gas & Electric new business manager, and PCEA past-president R. F. Fisher, PG and E vice-president, in charge of public relations and sales

ticularly for new uses, must be exercised. Farmers first of all must be cautioned in making equipment investments and once made, the equipment purchased is used for relatively long periods if these are satisfactory. If not the equipment once abandoned remains as an effective barrier to further load building. In other words, the equipment must be right if permanent load building is to follow.

Within the past 12 to 15 years, the utilities of this state have taken a very constructive attitude in the development of their rural business. First of all, they have guarded the interests of those using electrical energy for pumping by providing a testing service pointing toward the maintenance of high pumping efficiency. Secondly, the utilities have developed an effective corps of rural service men who are competent to advise with farmers on service problems. These men through years of direct contact with farm operations have learned how to size up rural problems from the standpoint of customer interest as well as that of the utility, to the end that loads once connected are likely to remain on the line to the benefit of both farm and utility. I sometimes wonder if utility executives are fully conscious of the fine service these men render to agriculture and if they appreciate the value of this service to the utilities in public relationships, to say nothing of the load building revenues they develop. These men are responsible for a type of service which calls for a certain boldness of effort yet at the same time it must be tempered by a severely practical caution. It has been my observation that the rural service men in this state possess to a marked degree these qualities. They are ever alert to new uses and eager to find out all about them, yet they are quite critical, as they should be, of new uses which have not had definite farm service records back of them.

California is now engaged in its sixteenth year of CREA activities in which research is its principal purpose. Its research programs are outlined by representatives of the utilities, farm organizations, electrical manufacturers, the regulatory bodies of the state and the agricultural experiment staions. This cooperative effort has been outstandingly successful because from the very beginning the basic conditions for true cooperation have existed. These are, first, the common problem; second, a problem which all have recognized can be solved more effectively when working together than if working alone; and finally mutual confidence and respect at all times between the cooperating agents.

House of Magic

Demonstration of research points to rich new markets

COMPLEX things from the laboratory of the scientist were simplified before the eyes of the 250 who were treated to a preview of the General Electric House of Magic. "Research to the average man means gadgets, but to the laboratory worker it is a quest for knowledge," said R. L. Smallman, Schenectady, in presenting the show.

Some products of the laboratory are purely spectacular and some find their way into industry and our everyday living. The House of Magic contained some of each. One noteworthy recent development is the machine that produces artificial fever in the human body. This was the outgrowth of experiments with short wave radio. The latest tool of this kind to be placed in the hands of the medical profession is the Inducto-Therm. These machines are now widely used in hospitals to develop internal heat deep in the tissues by means of current at 12,000,000 cycles. Fever is nature's only weapon against certain diseases and ailments. Now it can be produced at will and under absolute control.

For years science has looked for white light. Developments of gaseous lamps has now culminated in the new fluorescent lamp which gives a truly white light. This new and valuable tool has opened up new horizons for the lighting specialist and the whole electrical industry. A number of spectacular demonstrations were made around the stroboscopic effect of these light sources showing possibilities yet unexplored with fluorescent lighting effects.

A demonstration was made with a new thermo-magnetic metal showing that it is a magnet at ordinary temperatures, but when heated it becomes demagnetized. This has potential commercial importance and already it is being used in control and protective apparatus.

A number of demonstrations were made with the cathode ray ossillograph, some spectacular and some practical. This instrument is known by electrical men to be used by the operating engineer as well as in the laboratory. It is the device that has opened up the whole field of television, the commercial possibilities of which stagger the imagination.

A number of experiments with the electric eye proved most interesting. One was the transmission of sound with a beam of light, that is, using a light beam as a carrier. Phonograph music was transmitted across the stage and reproduced on a radio loudspeaker with good fidelity. Sound transmissions up to 30 miles have been made to airplanes and trains, although important applications still lie in the future.

In summing up, Smallman said, "Research helps to build for progress for the years to come. It makes possible new conveniences in the home, in industry and commerce, and gives to man control over power."

Movie

"Free men build a nation" tells about industrial America

PARTICULARLY well done was the motion picture, "Free Men Build a Nation," prepared by the United States Chamber of Commerce, and presented at the Thursday afternoon general session. Pictures of this type often fail of accomplishment because of length or because they savor too much of the interests that produce them. Not so with this picture. It was short and to the point.

With running comment throughout, the picture left its audience with some meaty food for thought. It showed how

free men, with money to invest in business and money with which to buy the products of industry, builded an industrial America from the turn of the century in 1930. In 1900, the working man had 30 cents left out of his income dollar for investment and to buy those things that have made a better happier, safer and finer America. In 1930, he had left only 5 cents to divide between investment and the things that make life worth living.

During this thirty year period the workers of America invested six billion dollars in new enterprises. They largely provided the capital for the industrial system that supported them. What has caused this decline from 30 cents to only 5 cents in the workers' margin of security?

Constantly increasing cost of government, continually mounting governmental expenditures and ever and ever higher taxes. These have greatly diminished the vital flow of capital necessary to put to work the products of initiative and enterprise, of invention and of research, and most important of all, to furnish work for the unemployed of America.

Thus, the picture constituted a well presented plea to us loyal citizens of this country to preserve and perpetuate the American philosophy of business that made this nation the envy of all the world by decreasing the strangulating influences of restrictive legislation and the destructive forces of oppressive taxation. "Give our dollars freedom to put on overalls and do a productive job — for what helps business, helps America." This was the closing admonition.

If this picture is available for general showing, it merits the attention of utility executives as an effective means of driving home to the working man the fact that he has a vital self-interest in helping to get business off the present detour and back onto the sound foundation of the main highway.

Public Relations

Wherein the part played by the employee is emphasized

By A. G. SCHERMERHORN*
Pacific Telephone & Telegraph Co.

WE in the telephone business believe that public relations consist mainly in getting on well with our neighbors. We believe that the purpose of public relations is to deserve and maintain public approval. A lack of public approval is expressed in a good many ways—laws, regulations, investigations, public hostility and most vital of all, a lack of patronage.

To deserve and maintain public approval we must run the business in the public interest and explain the problems surrounding us, so that the public understands it is in their interest.

It wuold seem that the conduct of a big business in a democracy should consist of about 90 per cent doing and about 10 per cent explaining what was done. But the 10 per cent is still a vital vital part of the enterprise.

Public relations are not publicity only, not management only; they are what everybody in the business says and does when in contact with the public. The company may have the best overall policies in the world in the minds of the management, but if the spirit of those policies is not translated into acts by those who have contact with the public, they will be largely discounted.

Public relations are an overall job in which everybody participates whether he knows it or not. There is no way of escaping this responsibility. Every day he is either building up or tearing down his job with the public.

Whatever the policies are, everybody must be let into the secret. Employees must be given an understanding of them. If an employee does not know a reason for the rule, he cannot explain it. Moreover, by instinct the public feels that if the employee does not know what it is all about, it will be impossible for the public to find out and there must be something unreasonable in it.

The relations of a business firm with the public are improved pretty much in proportion to the understanding of the spirit and reasons behind policies and practices. This is likely to develop better personnel.

It takes time and money and patient effort to inform all contact employees of the reasons behind routines and about fundamental company policies. Spreading such knowledge through the ranks of an organization must be looked upon as vital to the success of a business.

In discussing politeness, friendliness and reasonableness, I do not mean something employees can be trained to put on like a cloak. I am not talking about stage management. I am talking about character—running a business so that the more the employees know about it, the better they feel about it. They will have a pride in their profession and will want that profession to be held in high esteem by other people because it deserves to be.

Every day brings forth countless examples of friendliness and courtesy—doing the routine job in the unroutine way. Employees, unfortunately, don't think of them as unusual.

Every year the results of the company operations of the preceding year are discussed with practically all employees in group meetings in which any and all questions concerning the business are in order.

Last year, employees were given a a chance to attend short dramatic productions which we called "Service Skits." In these skits, many of the operations that actually occur between telephone company employees and the public were re-enacted on a stage. These little playlets have had a great practical effort in helping employees conduct the business in a friendly, attentive, personal manner, and a distinct aid in improving the "tone" of our service.

When the men and women in the business are satisfied that they are fully using the principles of courtesy and helpfulness in their contacts with the public, then the organization will be serving the public in a way that commands their respect and liking.

(ED. NOTE—*Eight of these "Service Skits" were presented during Mr. Schermerhorn's address under the title "Telephone Service on Parade."*)

SUNNY SOUTH—President-elect Houston (left) had plenty of supporters such as C. H. Thrane, General Electric Supply Corp.; H. D. Hawks, Anaconda Wire & Cable Co., and E. P. Markee, G-E Lamp Department Southwest district manager, all of Los Angeles

* An abstract.

New Lighting Tools

S. G. Hibben demonstrates new markets for new light forms

IN THE FIELD of lighting, there are jobs to be done and tools with which to do them, Samuel G. Hibben, Westinghouse lighting engineer and a member of the New York World's Fair committee on lighting, told a convention audience during the course of a spectacular demonstration. Opportunities abound as a result of things which are being done in the research laboratories today, he declared.

Selling the entire spectrum is the industry's greatest opportunity, Hibben said. There is a crying need for the industry to enlarge its vision to encompass the whole spectrum as a potential field in which new business is to be developed. For years, he stated, lighting has been in the 4,000 to 8,000-angstrom unit range which is the field of visible light. Today research has opened up wide new markets for the use of wave lengths both above and below this range. In the shorter wave lengths, there are the mercury vapor, fluorescent, ultra violet and germicidal lamps. At the other end of the spectrum are the new infra red lamps with a multiplicity of applications.

Artificial lights has passed the age in which its use was purely utilitarian and is entering an era in which, like great music, it will appeal to man's senses, create or change his moods, give him greater health and leisure and a longer, happier life, he declared.

"Lighting is entering a period of orchestration in which, like the instruments in the symphony orchestra, all the new sources and colors will play parts," he said. "We are heading toward a civilization in which electric lamps for lighting and numerous other purposes will add vastly to our leisure, our pleasure, our health and our life span. Already many of the sources we will use are past the research laboratory stage, and others are yet in the process of creation.

"Lamps of tomorrow will mood-condition our homes, paint pleasing and ever-changing pictures or designs on our walls, kill bacteria and so guard us against disease, provide us with health-giving radiation and suntan while we sleep. Plant growth will be aided by artificial light, simplifying our food problems and providing us with the so-called seasonal fruits and vegetables all year round. Heating lamps will simplify industrial heating and drying problems, may even dry the family washing or warm our homes in cold weather!

LIGHT WIZARD—Samuel G. Hibben, Westinghouse lighting engineer, brought a magician's kit of lighting equipment with him from New York

"All those things are possible today, and some of them are actually being done. Tomorrow they will be ready to serve all people throughout the world."

Hibben conducted a number of thrilling demonstrations to show the effects that might be created with the new light sources. These included a wide variety of ornamental effects, both in the form of lamps themselves and in the form of fabrics, floor coverings and wall papers. These latter are based on the fluorescent phenomena. Among the most spectacular demonstrations were glowing fluorescent balls which operated without any electrical connections whatever. He also demonstrated the use of fluorescent pigments in making sales presentations both for sign and flood-lighting.

Force of Ideas

Lloyd E. Wilson establishes a thesis for American stability

SETTING up as a basic requirement for American stability and prosperity, the thesis that every man able and willing to work should be given opportunity at wages that will permit him to buy the products and services of business and industry, Lloyd E. Wilson, director of public relations of the San Francisco Y.M.C.A., went further than most speakers on this subject by offering a tenable formula for solution of this problem in what was probably the most dramatic and inspirational address of the whole convention.

Solutions for the economic and social problems of America, he declared, had been coming from theorists, idealists and "dime a dozen brains," all of whom have been failures at their own businesses. Immediately disarming his audience by disqualifying himself with the statement that he had never met a payroll or had never run a business in the face of taxes, labor laws, and governmental restrictions and regulations such as are imposed on American business today, he challenged the leaders of business and industry to propose a satisfactory formula for solving the problem. Claiming that at no time ever had a solution been proposed by the business, financial and industrial brains who gave this country the great standard of living of any people in the world, he urged that these leaders be given an opportunity to try their hand. Apparently, he claimed, they have been lacking in unselfish determination to lay aside everything else and work at the problem. He made a plea that the business and industrial people of America work at the job of making a success out of America itself instead of a failure out of some man, organization or political party.

Speaking on the theme, "The Force of Ideas," Wilson pointed out that ideas are born, plans evolved and forces set into motion whenever there is hardship, adversity and confusion. These are the periods which create the greatest degree of leadership, he declared. In a period like the present, we might expect such leadership to reassert itself, he said, expressing the hope that in this case business and industry would come forth with the ideas which would set the forces of stability and prosperity in motion.

In the United States as well as in virtually every other country in the world the basic problem starts with sustenance; that is, food, housing and security for all of the people. When that problem is solved, he said, most others would disappear. He related this problem to the fundamental changes which are occurring in the population of the United States. He pointed out that there are a million less children under five years of age than there were ten years ago due to the falling birth rate. Proof that ours is a constantly older-growing population was contained in his statement that 80 years ago there were 889 people over 20 years of age for every 1,000 under 16. Today there are 2,100 over 20 years of age. The country is faced with all of the problems incident to old age with a population that has never been noted for its thriftiness. In 1938, he said, there were 21,500,000 people between the ages of 16 and 24 who had never known any other social order except that which we term as

"being the worst in the history of America." Six million of these are not in school nor at work and seven millions are employed at less than an average of $15 per week.

None of the five forces working at solutions to this problem have the answer, he asserted. Communism, Fascism, national socialism, new dealism with its 8 years of unprecedented control and spending or the 1929 kind of capitalism have been unable to propose a program satisfactory to the wishes or needs of the people of America, he said. Business and industry should seize upon the opportunity to present basically sound and good ideas to set the forces in motion which will give this country an orderly and prosperous democracy.

Annual Meeting

C. E. Houston elected president —PCEA membership grows

C. E. HOUSTON, assistant general manager, Southern California Edison Co., was elected president of the association at the annual meeting, succeeding W. W. Glosser, vice-president of Hubbard and Co. Directors elected included J. O. Case, Quality Electric Co., Los Angeles; H. H. Courtright, Valley Electrical Supply Co., Fresno; C. A. Dostal, Westinghouse Electric & Manfacturing Co., San Francisco; P. M. Downing, Pacific Gas and Electric Co., San Francisco; Harry L. Harper, Graybar Electric Co., Los Angeles; M. H. Jankelson, Incandescent Supply Co., San Francisco; L. M. Klauber, San Diego Consolidated Gas & Electric Co., San Diego; A. E. Strong, Coast Counties Gas & Electric Co., Santa Cruz, and G. C. Tenney, ELECTRICAL WEST, San Francisco.

Commenting upon the affairs of the association in his annual report, Victor W. Hartley, the managing director, pointed to the substantial increase in membership as well as some notable committee accomplishments. Membership in the association now totals 2,882 which is a 10 per cent increase over the same period last year. Included among committee accomplishments was the publication of a new edition of the "Farm Electrification Handbook" which has been distributed in 30 states in a number of farm countries, as well as throughout the territory served by the association. A second handbook produced is one devoted to industrial power and heating data. As a contribution to air conditioning technique, a report was published giving climatological data for many communities throughout California. Recently the industry information committee issued a report encompassing a program service which lists over 100 speakers available in the electrical industry and the subjects upon which they are qualified to talk before industry groups. It also lists numerous stereopticon lectures and motion pictures.

NEW PREXY—C. E. Houston, Edison company assistant general manager, was the unanimous choice for president of PCEA

Operating Economics

Section program runs gamut of engineering problems

Headed by Chairman A. G. Jones, G-E, and Vice-Chairman H. A. Lott, Edison, the Operating Economics Section met in five groups. The Section's program was built around a few well-prepared papers, but left the bulk of time for informal exchange of experience within each field.

Distribution-Transmission-Substation

Section Chairman Jones presided at meetings of the distribution, substation and transmission group, which considered three principal subjects: termite control, power factor and oil fires.

MOTIVATOR—Energy back of PCEA administration is supplied by hard-working "Vic" Hartley, managing director

"Termite Control" was covered in a paper prepared by C. T. Malloy, of Edison. This reported on experience which Edison has had with pole treating since 1935, when steps were taken to arrest the advance of termite infestation, then recognized as serious. All kinds of wood were involved, but about 75% of the cases were in cedar. Treatment consisted of drilling holes in the poles, treating with Paris green and plugging with dowels. The treatment was reported as having so far been highly successful. It was reported, however, that where full-treated poles were initially installed, no cases of termite infection, hence no corrective measures had yet been found necessary.

K. B. Ayres, of San Diego CG&E, said his company had taken somewhat similar steps, had records on a few poles treated several years prior to those covered in the Malloy paper, but did not feel the results were universally satisfactory.

Power factor was treated as a symposium, which was introduced by H. H. Minor, San Joaquin PG and E. He briefly summarized PCEA conclusions on the subject in the past two years, *viz:* "Capacitors for distribution correction cost nothing . . . where the general system needs correction for reactive current . . ." He also pointed out some special applications, referring to his article in May ELECTRICAL WEST "Correcting on the Low Side," and concluded his remarks with the suggestion that the engineer seldom needs the huge array of capacitor formulas to be found in various texts, can usually solve his problem by resort to a few simple curves. Minor's discussion served to introduce the discussion of harmonics and voltage correction, covered in the following two papers.

There was keen interest in "Harmonic Experience With Distribution Capacitors," a straightforward report by C. G. Smith, PG and E. Smith emphasized that capacitors themselves produce no harmonics, but tend to aggravate harmonics orginating elsewhere because their impedance is lower to higher frequencies.

Main cause of harmonics he gave as overvoltage in distribution transformers — a condition arising from transformer operation above nameplate rating, thus greatly increasing magnetizing current and hence harmonics. Main means of avoiding harmonics on the system he gave as avoiding overvoltage and providing delta windings, thus confining triple harmonics to the transformer itself. He pointed out that capacitors near the transformers may

METER EXPERTS—L. A. Nott (left) said this was an argument over meters with Harry Wittenburg (center) and W. M. Nott (right). All are with Sangamo Electric Co., Wittenburg from Los Angeles and the two Notts from San Francisco

improve wave shape on the lines by providing a low-impedance path for the flow of harmonic currents.

Referring to character of the load as influencing harmonics, and to various factors as leading to resonance, he outlined corrective measures but emphasized that the most economical procedure is to prevent harmonics in the first place by giving close attention to proper design and operation of associated equipment at the time capacitors are to be installed.

H. E. Jung, Edison, presented a paper, "Voltage Correction With Capacitors," which gave a detailed analysis of two case histories. These concerned situations in which voltage correction on heavily-loaded circuits was necessary. In one, for example, the installation of capacitors on only those circuits requiring attention was $17,500 cheaper than applying extra synchronous capacity to the entire 4-kv. bus would have been. In addition to correcting the voltage, the procedure released capacity for a net gain of $22,200 in capital and $2,600 in estimated annual carrying charges.

F. S. Benson, PG and E, and R. A. Wallingford, Edison, led the discussion of oil fires. Benson told the PG and E is providing gas masks for attendants in larger stations to provide versatile protection, including that against CO, considered to be dangerous in some insulation fires. In steam stations, asbestos suits are being provided, equipped with zippers rather than buttons and with hoods big enough to accommodate masks.

He discussed different types of apparatus being used, with particular reference to various fog-nozzle systems—40-gal. portables, extensive fixed systems both indoors and out, and back-up water systems plus hose which are being installed at new steam stations.

In discussing Edison experience, Wallingford brought out that location of equipment is of vital importance, since the equipment can be put out of service by the very element it is installed to control. He cited a case in which 250 gal. of burning oil was thrown over a large area, so that the attendant had first to fight his way to the extinguisher with a garden hose.

Meter Group

Fred Garrison, G-E, presided over meetings which carried on two previous studies of this group. W. H. Talbott, San Diego CG&E, presented a paper on "Field Testing Procedure for Single-Phase Meters." This bore partly on the question of what the test period should be, reporting on the findings of various systems, partly on recommendations for test procedure, as compiled by M. W. Edwards, of the California Railroad Commission, from an agreement reached by the PCEA meter group two years ago. There is some divergence of opinion as to most economical test period, with results appearing to range from 5 to 10 years.

An exhaustive study of 5- and 15-amp. meters, made by Edison throughout the year, was reported by K. M. Stevens. Contrary to hopes of the group, which had favored standardizing on 15-amp. units, the results appeared to indicate appreciable losses on 15-amp. meters at light loads by reasons of high starting watts. William Lindblad, PG and E, presented a paper on developments in meter-bearing jewels, with reference to those of several manufacturers.

Steam Generation

V. F. Estcourt, PG and E, led an entirely unrehearsed discussion in which steam men found much to talk about. Major discussion concerned motors, and PG and E reported it is using totally-inclosed motors for outdoor service, both 240- and 2,300-volt 3-phase, with emphasis on ability to go into action—remain condensation free—after remaining idle for several weeks. Edison reported fewer outdoor installations. Electrical interlocks on boilers formed a second discussion. Edison reported steering away from their use, but PG and E reported they are being used more and more, as well as electrical annunciators in power plants.

Hydro Generation

Hydro men likewise devoted their time to unprepared discussions, led by George H. Bragg, PG and E. A scheme for preventing a power-house from flooding during dismantling was discussed. This consisted of drawing a "stopper" into the draft tube with a line. High water did occur during the job and the procedure proved effective. Performance of various bearing materials was discussed, and a breaker-motion analyzer was described.

Safety Committee

Led by Howard Miller, Edison, safety men went into the subject of pole-top resuscitation, turned out a recommendation for its use, but left it to the systems to determine the precise method of use. First applied in Pennsylvania, pole-top resuscitation has been pioneered on the Pacific Coast by the Los Angeles Bureau of Power & Light, which is reported to have experienced two highly successful applications this year. Other Western systems are now using it to varying extents. A colored movie of the method, filmed by Edison, was shown.

Much of the remaining discussion was an endeavor to get better answers to the basic questions: Just what are the physical effects of electric shock? What can be done about it? Prof. C. F. Dalziel summarized his results to date in studies of the effects of shock on the human body, a study being conducted in connection with the CCREA.

Section Meeting

Operating economics members met en masse for their final session. Walter C. Smith, G-E, continued a paper of last year on lightning studies in California, concluding that peculiar factors apply to California systems, and that "it is evidently not sound policy to protect all equipment from lightning indiscriminately, but desirable to provide protection in certain selected areas." J. B. Madden, PG and E, said his studies showed the bulk of trouble occurred on old, small transformers. He also found in classifying all failures in transformers from causes considered to be other than lightning, that the failures occurred on the same days or closely following lightning storms.

The first EEI-NEMA joint report on standards for distribution tranformers was presented to the group by D. R. Benson, G-E, and some additional comments were made by A. B. Campbell,

of EEI. S. J. Lisberger, PG and E, suggested that the EEI-NEMA committee consider extending the standardization to include such parts of the transformer as cover bolts and nuts, small terminal parts. He pointed out that it was a great nuisance for the utility to stock several different kinds of these very small parts, and that no one scheme in use by major manufacturers appeared to have any outstanding merit over another.

Business Development

Section runs the scale of impediments to selling

TO recognize a problem may be half way toward solving it, but half measures do not satisfy the Business Development Section committees. And since the range of impediments which restrict selling runs all the scale clear up into the ultra-violet, the committees and discussion groups at this convention covered as wide a scope.

E. G. Stahl, San Joaquin PG and E, Fresno, vice-chairman, presided in the absence of Fred C. Todt, G-E Supply, Los Angeles. Individual committee meetings were held on Wednesday afternoon. The wiring group and the lighting group met in a joint session Thursday morning followed by a general assembly of all committees in group meeting.

Range, Water Heater and Air Heater Committee

W. H. Gribble, Thermador, chairman—NEMA's proposals for standardizing electric water heater tank sizes, also number and placing of heating elements in order to eliminate costly specialization drew the most discussion after E. J. Baughman, Hotpoint, read the proposals. NEMA and EEI proposed standardization on six wattages for elements, 236 voltage, 150 deg. thermostat setting, 20 watts for lower, 30 for upper and 50 per single unit element per gal. Discussion centered on whether single or twin unit heaters proved best. Eastern tests, said Baughman, found twin units more economical, efficient, took lower consumption and gave better load factor. Cliff Russell, Wesix, declared Portland General Electric and other utilities' tests found single unit heaters more efficient, with less demand, and tank sizes could be less bulky. Forrest Naylor, PG and E, spoke of a need for performance and insulation standards as well. Harold Conklin, Hotpoint, asked the utilities first to decide what standards they agreed upon; manufacturers would comply.

A survey among employees of PCEA member companies was interesting. From 20,000 questionaires, 5,616 replies were tabulated. Advantages of electric ranges were listed in order of appeal as cleanliness, safety, coolness; of water heaters, safety, cleanliness, no vent, speed, silence. Ideas as to cost of operation of a range ran from $2 to $8 a month. It was recommended that tabulated results be sent to member companies to guide their own employee education, and that a follow-up circular be sent to all employees answering their questions and correcting misconceptions.

Refrigerator and Traffic Appliance Group

O. R. Doerr, PG and E, and H. C. Rice, Edison—led the way in a spirited meeting of the Refrigerator and Traffic Appliance Group Wednesday afternoon. Assisted by men and women in all branches dealing directly or indirectly with this particular field of electrical appliances, the two session leaders steered important thought up the right channels and where resultant discussion would do the most good.

Most of this discussion centered around a talk by William Vogel, Electrical Appliance Service Corp., Los Angeles, who explained how he has helped to solve the difficult problem of refrigerator trade-ins. Vogel maintains a refrigeration reconditioning plant in southern California, where he "remakes" on an average of 2,200 refrigerators a year.

For a flat price of $20, he will rebuild any make or model of refrigerator, thus affording dealers an opportunity of making actual profit from trade-ins, usually a loss item on their books.

"Trade-ins will always be with us," Vogel declared. "Why not lick the problem and make a profit to boot?" He explained how eastern dealers were reconditioning refrigerators by the thousands and shipping them to the Pacific Coast to be sold.

He claimed that reconditioned refrigerators had a real market in the low salary group which couldn't afford over $80 for mechanized refrigeration. With $10 set as a price on an average trade-in, Vogel declared that with his flat price at $20 ($25.25 on sealed-in units) a dealer could sell such a refrigerator for at least $49 and so make himself a small profit.

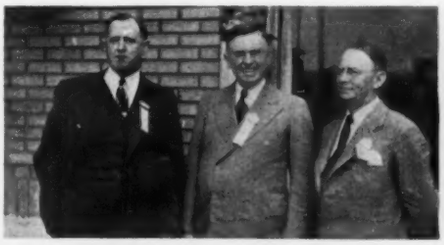
His own problem, he stated, was labor. He couldn't find enough men who could service refrigerators properly.

Bill Powell of Westinghouse and others felt that the price war could not continue for long. "We can't go on making sixes for $119," he said. He admitted that sales were good, but hoped along with "Rod" Doerr that it wasn't just the low price alone that was responsible for the increases.

H. E. Sandoval, discussing traffic appliances, condemned the various buying groups which he felt were the cause for dealers' lack of interest in pushing small appliances. Federal, state and city employees, banks, railroads, oil companies, doctors, teachers and fruit-growing and livestock organizations, he claimed, were guilty of cheap mass buying. He felt that dealers might get together in an association to curb these practices in furthering proper legislation to protect their interests.

Gladys Cronkhite, KGO home economics director chided the group about the fact that women who bought small appliances usually didn't know how to use them properly. She offered her services and those of other home economics girls both on the air and on newspapers, to help further the cause of small appliances, if only manufacturers and distributors would furnish her group with information on them; material they could use in their daily work.

Fred Yeger, Bank of America, in a closing talk of the afternoon, discussed and explained the small loan market, which he claimed had grown to amazing proportions, thus offering dealers new opportunities for sales, if proper selling was done.



GOLF TO GAIETY—Golfers performed under the direction of (left to right) J. O. Tobey, PG and E Sacramento division superintendent; Frank Boyd, Pacific Electric Motor Co. (chairman), and J. E. Crilley, General Cable Co., while I. W. Borda, Okonite Co., was program chairman, and A. H. Dahl, G-E Supply Corp., staged the banquet

EXPERTS—Top: Al C. Joy, PG and E manager of advertising and publicity, talks with H. H. Courtright, president of Valley Electrical Supply, Fresno. Center: A. H. Dahl, G-E Supply Corp., listens to PG and E purchasing agent Fred Hanson. Bottom: A. Emory Wishon, vice-president and assistant general manager, and Paul M. Downing, vice-president and general manager, PG and E are PCEA past-presidents

Wiring Group

C. A. Rowley, Thermador—presided in the absence of J. O. Dillingham, G-E—Following reports of the Red Seal Adequate Wiring committee, the code and ordinance committee, the demand and diversity factor committee and discussion of the 1940 National Electrical Code led by C. E. Heise, Westinghouse, the wiring group passed resolutions returning to the northern California Red Seal committee recommendation for certain revisions in the northern California Red Seal Adequate Wiring standards. It was also recommended that the uniform code committee be continued. From the foretaste of the value to be had from a study of demand and diversity factors it was strongly recommended that the PCEA invest in such an analysis in 1940 and 41.

Considerable dissatisfaction was expressed by inspectors, contractors and others over the new wire tables to be found in the 1940 edition of the National Electrical Code. While the desirability of the thin-wall wire was recognized, the confusion anticipated in determining wire sizes and kinds based on ambiant temperatures and various grades of insulation brought a recommendation that future revisions of the Code make serious effort to simplify these tables.

Lighting Group

Presided over by L. A. Hobbs, Smoot-Holman, San Francisco, and G. M. Rankin, Edison, Los Angeles.—George Gilleard, Stanford University Fellowship student, presented his paper "Illumination design for self service stores" given at the IES conference at Los Angeles. The need for design of equipment to provide vertical illumination for such stores was developed in his paper.

"Light conditioning in the home" was discussed by Clark Baker, lighting counselor, PCEB. He discussed the necessity for cooperative effort to meet the problem with interior decorators, paint and other allied interests. H. N. Carroll, PG and E, also presented his paper "Western lighting opportunities" first given at the IES conference. (See page 146-7).

Fluorescent lighting came in for discussion by two speakers, Walter E. Carlson, G-E Lamp Dept., and William P. Bear, PG and E. Carlson described the lamp manufacturers' recent developments which bring fluorescent lighting under better control and urged cooperation with manufacturers to prevent the racketeering of equipment using these new sources. Bear presented studies of comparative costs between fluorescent and incandescent lighting installations, debunking the idea that fluorescent lighting necessarily is cheaper and advocating that it be sold on its merits.

Samuel G. Hibben, director of lighting research, Westinghouse, Bloomfield, N. J., was asked for comment and spoke meatily on the controversial subject of fluorescent lighting. He mentioned the longer life which experience is proving, spoke of higher wattages now being developed for higher intensities by the laboratories, mentioned a factor to be considered—that of the fading of goods from high intensity lighting—emphasized the necessity for wiring to full adequacy because of future increases in wattage that are forthcoming, and told of the trend for less lamps of daylight color and more of the newer white. As for losses suffered by the utilities, he mentioned the tremendous decreases in prices brought about by lamp manufacturers and the losses these represented. Extension of fluorescent to the home, he cautioned, would be a very ticklish problem and must be carefully developed.

Joint Meeting—Lighting and Wiring Groups

J. E. Hammond, San Joaquin PG and E—told of the importance of lighting for outdoor sports, not from a revenue angle, but from its public relations aspect. While such lighting is a poor load in some respects and not a revenue producer, its value in reducing juvenile deliquency not only has humanitarian aspects but makes savings to the entire business life of the community by reducing the high cost of public institutions and prisons for housing of delinquents and criminals.

C. A. Rowley presented an up-to-date recommendation for standardized services that would begin with full adequacy rather than at present minimums. By standardization and simplification cost could be reduced and several important selling points to the building public could be developed for the industry.

Power Group

P. P. Pine, San Diego C G & E, presided with W. P. L'Hommedieu, Westinghouse Electric and Mfg. Co. G. N. Hawley was then given charge of the meeting.—Data sheets on industrial heating as published in ELECTRICAL WEST were exhibited by J. A. Corlett, G-E, and their distribution explained. Cost of the sheets was discussed and recommendation made that the work be carried on next year. Supplementing this it was recommended that current articles in technical publications of interest to industrial and power salesmen be called to the attention of Mr. Corlett to be compiled into a reference sheet and distributed.

Tremendous increase in use of welders necessitated study of welder ratings and operating conditions. C. L. Ashley, Edison, suggested uniform practices on the rating of ac and dc welders and spot welders and suggested further study of large welders and percussion welders. Any data available on the operating characteristics of any make of welder were requested to be compiled and furnished as handbook information.

S. A. Cundiff, Nev-Cal, led a symposium on competitive power. Speakers on this were A. L. Laws, Edison, on butane competition; A. M. Frost, PG and E, on agricultural competition; and G. M. Hawley, Edison. Hawley presented the results of a committee survey representing 95 per cent of the power companies of the PCEA. For the first time, these analyses show the trends in the competitive power, illustrate from what they are caused, and enable the power companies to prepare in advance for approaching conditions which may cause an increase in gas, diesel, gaso-

line, butane or steam plant competition. Compilations of further data next year are to be made on individual cases to determine the type of reason back of the loss of load through competition.

Air Conditioning Committee

H. H. Douglas, Edison, chairman.—With the work of the year completed the air conditioning committee did not hold a meeting. Work of the year was preparation of a survey of California climatological data to be used to guide engineers, utilities and manufacturers in the design of specific equipment for air conditioning in various areas of the state.

General Assembly—Business Development Section

Paper presented by William P. Bear, PG and E at the IES conference in Los Angeles, "Fluorescent Lighting and the Utility," was delivered at the beginning of the general assembly of the Business Development Section, Thursday morning, E. G. Stahl presided.

John R. Pitsker, editor "Housing" magazine, spoke humorously of his experiences as a consumer who upon buying a so-called modern house and even having additional work done upon it discovered its wiring inadequate when he wished to use appliances. He urged the industry to follow the precepts of an anonymous quotation "To be abreast of the times, we must always be a little ahead of the times."

Samuel F. Worswick, sales counselor, closed the meeting on a note of inspiration under the subject "The customer speaks." Classifying the customer as the boss or real employer of everyone who is in the industry, he urged adequate training to meet and hold the goodwill of "the boss" upon every sales contact. The importance of personality development and of a periodic check-up of individuals, he summed up in the admonition that each ask himself "Would I give me a job?"

Administrative Services Section

Public reaction to all activities is considered first

Utilities, jobbers, an electrical bureau, and both large and small manufacturers contributed valuable ideas and suggestions to the symposium Thursday morning on the "Selection, Training and Advancement of Employees." With M. W. Phillips, Edison, presiding, and S. W. Scarfe, G-E as sponsor, this general assembly brought to light various company policies concerning young men and women who came job seeking to their doors.

Though these policies seemed to differ in some respects, they were the same at heart—the desire to help direct or guide jobseekers toward their real job in life, and not to shun them or to be discouraged about the present or future.

In regards to the selection of employees, it was felt highly important by Ray Edwards, San Diego CG & E that all jobseekers be seen and heard, that courteous treatment be given, that if employment was impossible, they would leave the personnel office at least with good will in their minds for the company.

Edwards declared that his company interviewed 11,000 "customers" last year, and that he considered all of them good contacts, especially when some of them had been directed to other jobs in other companies by him.

Others, among them Norman Arntzen, Hubbard & Co., Joe Long, Edison, Gene McCann, PG and E., Charles Warner, GE, thought that selection of employees involved basic requirements, such as a technical and practical background for industrial salesmen, college graduates for certain jobs, high school graduates for others, and local jobs for local people.

Training of employees varied with company policies. General Electric's "Interneship in Business" program according to R. E. Smith, Edison, struck a real chord. Most of the companies conducted training courses, placed new men under trial for a year period, with ratings throughout that period determining their status.

Clark Baker, PCEB, northern division, explained the training of craftsmen as carried on under his direction. He especially emphasized that his pupils were "industry employees" studying a program set up to cover many phases. A thousands men were under his tutelage last year, with 750 on the waiting list, he claimed. Various trades included electrical craftsmen, printers, painters, mill and cabinet workers.

Advancement of employees was determined by ratings of supervisors, department heads, depending on ability, honesty and years of service. The "relatives" problem and "drag" were discussed and it was found that these things constituted a real personnel problem. The session concluded with a resolution to carry on the study of the committee.

Under chairman M. W. Phillips, Edison, and vice-president E. A. Long, PG and E, the Administrative Services Section also held committee meetings on Wednesday afternoon. Individual committee action was as follows:

Purchasing and Stores Committee

F. P. Hanson, chairman, PG and E.—Viewpoint of the manufacturer was carried to purchasing agents by three spokesmen. J. M. Culverwell, Kortick Mfg. Co., brought along to illustrate his talk, "Standard Packages, Carton, Wood or Metal," actual packaging material to illustrate the manufacturers' problems in providing standard packaging for various types and weights of materials. Packages must not cost disproportionately, yet be easy to handle by the purchasing departments and storerooms of the utilities. He told of the desire of manufacturers to work out mutual packaging problems with the utilities so as to reduce handling and packaging costs.

"Specifications from the manufacturer's point of view" was presented by W. R. Noder, Pacific Electric Mfg. Co. He told of the need for exactness in specifications even at the expense of repetition of words. He cautioned against special requirements that would make it

SPECIALISTS—Top: D. D. Smalley, San Joaquin Power Division general superintendent, P. G. & E., and W. P. L'Hommedieu of Westinghouse Elec. & Mfg. Co. Center: A. F. Morairty, Central Arizona Light & Power vice-president, and Major C. L. Moore, Chicago Flexible Shaft Co. Bottom: Walter Smith, G-E engineer, and Vernon Armstrong Sierra Pacific chief engineer

difficult for all reputable manufacturers to supply. Reference to established standards are usually preferable, he pointed out.

"Purchasing from the viewpoint of the seller" by Harry F. Hartzell, Maydwell and Hartzell Co., combined humor and good sense in his comments on purchasing agents. He noted trends for purchasing departments to chisel prices less, assist more in maintaining standards, and of standing their own share of entertainment expense.

Scope of purchasing and stores was given in several papers describing purchasing departments of utilities. S. E. Hickman, division superintendent of supplies and transportation, San Joaquin PG and E, spoke on "Traffic and Transportation," describing that company's setup. "Handling and storage of materials" by H. H. Scoville, PG and E., described the Emeryville warehouse of that company. There were papers on purchasing procedure by J. P. Schaefer, Coast Counties, L. B. Stilwell, Tucson G & E, and George M. Richardson, Phelps Dodge Co.

The public relations aspect of purchasing was discussed thoroughly following papers by D. E. Jones, Nev-Cal, read by William de Waard, San Diego C G & E, and by E. A. Long. Advantages of local purchasing and of the friendly attitude toward vendors was strongly emphasized.

The committee recommended continued study on standard packaging, public relations in respect to purchasing, salvage of materials by utility companies, handling of inventories of merchandise, particularly in reference to obsolescence and damaged goods, and uniformity of catalogues and publications.

Transportation Committee

P. H. Ducker, chairman, Edison.—Transportation men discussed policy in reference to use of personally-owned automobiles by employees on company business. Generally they recommended unfavorably against selling of gas and oil to employees for use in their own vehicles. Also discussed was the necessity for standardization and rating of commercial vehicles so as to bring the methods of taxation and registration into uniformity.

Most concern was expressed over the confusion caused by recent orders of the Interstate Commerce Commission in reference to its safety regulations applying to vehicles of private carriers. The confusion arises from interpretation of just when a vehicle is to be considered in interstate commerce and when in intrastate commerce. Where the former, changes in equipment for lighting, safety provisions and other physical limitations must be taken into account. Each company was advised to consult its legal department and be guided accordingly. The commission has exempted public utility work trucks from the requirement of maintaining drivers logs. Had this been enforced, it would have proved expensive and time consuming and have had no value.

SHOWMAN—Harold Q. Noack, Hubbard & Co., won universal plaudits as general convention chairman for staging a highly successful and entertaining convention

Customer Relations, Credit and Collections Groups

C. E. Hewes, Edison, sponsor—handled the joint meeting of both groups. P. E. Thomson, PG and E, outlined the general collection procedure of his company. He was followed by K. L. Boosey, San Jose division, who presented an interesting development of classification of accounts for collection based upon experience with customers whose accounts outstanding ran for varying lengths of time. Classification is made into five groups, it having been found that 84 per cent of the customers come within the first two groups who pay up within the first two months automatically without necessity of follow-up. Accounts older than two months are flagged in so that the credit supervisor may personally follow them up in such a way as to maintain good customer relations.

In the absence of A. L. Code, Southern California Edison Co., Joe Long read his paper on the establishment of credits and classification of accounts. Recognition is now taken of the part the credit man plays in establishing contacts with customers, he said. Selection of the right type of men to do the work is recognized. The importance of knowing customers personally and developing better contacts for personal relationships was emphasized.

Accounting Group

L. W. Coughlan, sponsor, PG and E—Handling of the accounts in connection with the sale of load-building appliances was discussed under leadership of Harry McGann. This was followed by a paper on accounting for depreciation led by R. M. Dreiman, Coast Counties. There was also general discussion of methods for handling of replacement of minor items of plant which involved the problems of depreciation expense and reserves. The remaining time was spent in discussing the new classification of accounts set up by the California Railroad Commission and effective January 1, 1938.

Women's Committee

Revived after several years dormancy was the Women's Committee of the association. When the association retrenched in the early days of the depression the Women's Committee was cut off the agenda. However many companies retained women's committee organizations, all of them doing notable work and being a credit to their companies. The gas industry association in a sense took over the old women's committee of PCEA, acting as a clearing house for ideas and methods and programs for Women's Committee work.

President Glosser revived the Women's Committee as a part of PCEA this year. A dinner, Thursday evening, was presided over by Mrs. Eleanor Gemmell, PG and E, who, in reorganizing the committee, recited what had been done by company committees, what could be accomplished by a PCEA coordinating committee again. Short talks by President Glosser, Managing Director Hartley and others preceded the address of Public Relations Counsel. Mrs. Robinson who has been conducting personnel training courses in some companies working with the women employees to improve themselves in personality, appearance, and public contacts and public relations. In her talk she urged women in business to retain their essential femininity, to recognize their particular sphere of work and to adjust themselves clearly to the requirements of business.

Divertisement

Arranged so that the convention would terminate the day before the reopening of the Golden Gate International Exposition, on May 25, the entertainment program of the convention directly aimed to make that the highest light. Yet of its own collateral entertainment during the hours between sessions the program had ample opportunity for fun.

The banquet, naturally, climaxed the three day session, on Friday evening. Under chairman C. A. Dahl, G-E Supply, a speechless dinner was followed by an excellent show of variety acts and then a ball. Linking the entertainers with the convention was a surprise inva-

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Many a participant at a P.C.E.A. conclave has said this to himself, when confronted with some new electrical idea—some new "slant" that enabled him to revitalize his business or enlarge and reestablish the scope of his job.

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sion of the program by a "college band." In the banter between its leader and Harold Noack, acting as master of ceremonies, a number of gags about people in the industry were introduced.

Preceding the banquet the manufacturers, distributors and suppliers were hosts at a cocktail party. Frank Angle, Allis-Chalmers, was chairman of this host committee.

Moving pictures were offered on two occasions for entertainment, the feature film, "Slim," a story of a lineman, on Thursday evening. On Friday afternoon color movies taken by Chester Coons, Live Line Tool Co., showing color lighting of the fair, and a tour of the West, were shown. Ladies' entertainment included a preview tour of the fair and bridge luncheons and other events. Fred Mulvany, Maydwell and Hartzell, was chairman of this committee.

Ninety golfers played in the annual tournament held at the Claremont Country Club under the direction of a committee headed by F. E. Boyd. Prizes were awarded at the banquet to the following winners:

Low net, 18 handicap and under: H. M. Byllesby Cup, D. D. Smalley, San Joaquin Power Division, P. G. & E.; runner-up. J. P. Carson, Graybar Electric Co.

Low net, handicap over 18: Pelton Cup. C. E. Picher, Southern California Edison Co.; runner-up, S. W. Murray, Westinghouse Electric Supply Co., Los Angeles.

Low net, power company employee: Addison B. Day Cup, D. D. Smalley.

Low gross: W. C. Figroid, Gilson Electrical Supply Co., Oakland.

Closest to cup, No. 8 hole: Roy Torvinen, Sierra Pacific Power Co., Reno.

Player with most 3's: H. F. Hartzell, Maydwell & Hartzell; runner-up, K. T. Romie, Fireproof Wall Co.

Player with most 7's: C. A. Dostal, Westinghouse Elec. & Mfg. Co

Blind bogey: Fred. C. Owens, Hubbard & Co.; I. C. Steel, P G & E.; Harold Thrane, General Electric Supply Co.; W. G. Stearns, Okonite Co.; D. P. Cady, Maydwell & Hartzell and George P. Hunt, P. G. & E.

● "THE LEAGUE IN REVIEW" is a handsome 16-page publication that outlines the 1939 activities of the Electrical Development League of Southern California and traces its rise since 1935 to become an important factor in the attainment of the industry's aim of electrical modernization of southern California. With the cry "California's Electrical Age Has Just Begun," the League under the guidance of Graham Holabird, president; Harold Conklin, vice-president; A. A. Scheuler, secretary-treasurer, and F. L. Hockensmith, general manager, has expanded to take care of every phase of electrical activity and promotion in Southern California. From retail appliance campaigns to the formation of the Electrical Maintenance Engineers Assn., the work of the League is far-reaching and of great benefit to the industry.

● SUMMER MEETING of the Pacific Division, National Electrical Wholesalers' Assn., will be held at Hotel Del Monte, Calif., June 13-15. In addition to the regular closed meetings, there will be two open sessions, on Friday and Saturday mornings, respectively. R. G. Kenyon, advertising manager, Southern California Edison Co., and O. R. Doerr, general sales manager, Pacific Gas and Electric Co., are scheduled to speak on the Friday morning program while the Saturday session will be sponsored by the Ben Franklin Electric Clubs of northern and southern California.

Agenda

Summer sessions of electrical leagues called to order

Here are the abbreviated minutes of meetings and gatherings of electrical associations throughout the 11 Western States during recent months.

AIEE—Seattle Section—Joint meeting of student branch of AIEE held April 23. Speaker was Charles B. Lee, graduate student, whose topic was "Metering of Reactive Voltamperes by means of symmetrical components." F. W. Bush, sales engineer, Allis-Chalmers Co., also spoke. Pacific Coast convention is set for Aug. 27-30.

Associated Pot & Kettle Clubs—Annual convention is to be held June 28-30 under auspices of Pot & Kettle Club of Seattle. Exact spot is Port Angeles, Wash., Lake Crescent Tavern. Harry C. Gleason, Seattle and Holt Berni, Portland, form the convention committee.

Electrical Estimators, Los Angeles—Feed staged by The Thermador Electrical Mfg. Co. on May 9. Dinner meeting and free beer "festival" on May 17.

EMEA—Southern California chapter—Los Angeles—At dinner meeting May 21, Westinghouse Electric presented "The Middleton Family," a technicolor sound picture of the New York World's Fair. R. Glen Woods is president of this association.

Electric Club of San Diego—Dean T. Smith, supervisor public activities Southern California Telephone Co. on April 23 discussed the Speech Frequency Inverter and other gadgets, assisted by H. B. Axtell. Chairman of the day was Albert E. Scott, district manager, Southern California Telephone Co. On May 7, J. A. Sickenburger, U. S. Electrical Motors, Inc., presented a sound motion picture, "Underground Raindrops," dealing with manufacture of electric motors in the development of water in rural areas. D. H. Ogden was chairman. Dr. Kenneth E. Barnhart, professor of sociology, San Diego State College, gave an interesting talk on May 14 on "Life with the Knights of the Road."

Electric Club of Washington—Eugene R. Hoffman, Seattle City Light, spoke April 22 on the construction of Rss Dam. Clark Eldridge, bridge engineer, at the next meeting, April 29, gave an illustrated talk on the new Narrows Bridge, Tacoma, Wash. On May 6, Henry J. Gille, manager of industrial and agricultural development, Puget Sound Power & Light Co., spoke on "Gold and Silver." George W. Coplen, chairman, Seattle Housing Authority, addressed the club May 13 on "Low Cost Housing and Slum Clearance."

Electrical League of Utah—Salt Lake City—Subjects of a skit presented by representatives of the Mountain States Telephone & Telegraph Co. on April 24 were "Use of the Dial Telephone" and "Good and Bad Telephone Habits." Will O. Smith addressed the league, May 29, on "Effects of Adequate Wiring on the Electrical Industry." Smith is Rocky Mountain sales manager for General Electric Supply Corp.

IAEI—Utah Chapter—Dr. H. T. Plumb, special consulting engineer, Rocky Mountain district, General Electric, gave an illustrated lecture on "Polarized Light and Radio Waves" recently. Wilbur R. Cox, district chief engineer, Board of Fire Underwriters of the Pacific, discussed "Underwriters' Inspection as Related to Rate Making" on May 7.

IES—Southern California section—Joint meeting with American Society of Heating & Ventilating Engineers held May 14. Speakers were Lloyd A. Gates, Illumination Section, Los Angeles Bureau of Power & Light, and Frank Park, Western Air & Refrigeration, Inc. Gates was past chairman of the society.

NEWA—Pacific Division—Next meeting is to be held June 13-15 at Hotel Del Monte, Del Monte, Calif. R. J. Holtermann, is acting secretary for the division.

"X" Electrical Club—San Francisco—Program on May 1 was arranged by Pacific Coast Electrical Bureau. George Barker spoke on the work of the Bureau and Walter Heston gave a lighting demonstration. Members meet at the Pig'n Whistle, San Francisco.

● DELEGATIONS from Los Angeles and San Francisco sections and individual members of the Illuminating Engineering Society from other parts of the West are making plans to attend the IES convention at Spring Lake, N. J., Sept. 9-12. Among the new subjects to be treated at the convention are lighting for photochemical processes, mean radiant temperature from lighting systems, use of radiant energy for the application of heat and other related subjects. The last day will include a visit to the New York world's fair.

● THE ELECTRIC COOKERY COUNCIL of southern California elected C. Arthur Sanford, Bureau Power & Light, Los Angeles, as president of the organization. Other officers installed for 1940 are: John Holland, vice-president; Charles Hull, recording secretary; Greba Avery, executive secretary-treasurer; "Hamp" Stewart, sergeant-at-arms. Bill Clary was the retiring president.

● WILLIAM J. GAFFNEY, chief inspector for the Tacoma City Light Dept., has been named third vice-president of the International Assn. of Electrical Inspectors. He will fill the unexpired term of the late H. A. Patton of Seattle. He is also second vice-president of the Northwest district, and chairman of the Tacoma chapter for the past three years. Gaffney has been with City Light for 15 years.

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AFTER all, the best assurance of dependable operation and protection is the record of actual field performance such as thousands of Kearney Tripomatics have given over a period of years—in all sorts of weather—in various sections of this country.

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IAEI Convention

Northwestern section program set for Sept. 3-6 in Montana

How copper wire is made will be one of the feature of the 14th annual conference of the Northwestern Section, International Assn. of Electrical Inspectors at Great Falls, Montana, September 3-6. A visit to the great wire mills of the Anaconda Copper Co. at Great Falls and to the several power plants of the Montana Power Co. along the Missouri River are among the educational and entertainment features planned by a large local committee headed by H. E. Chandlis of Great Falls. A new edition of the National Electrical Code will be out and the new tables on carrying capacity of wires will be discussed by a representative of the wire manufacturers who conducted research on the subject for the National Electrical Manufacturers' Assn.

Committees in charge of the convention arrangements have been announced by Fred D. Weber, secretary, Northwestern Section.

The general committee consists of H. E. Chamdliss, Montana Power Co., Great Falls, chairman; F. D. Weber, treasurer, and C. M. Kirsop, Olympia, Wash. Chairman of the local sub-committees are as follows: Finance, R. E. McDonough, Montana Power Co., Butte; Exhibits, L. M. Burdick, G-E Supply Co., Butte; Entertainment, C. T. Booker, Montana Power Co., Great Falls; Hotels, C. P. Egan, Rainbow Hotel, Great Falls; Publicity, Thomas Lloyd, state inspector, Board of Fire Underwriters of the Pacific, Butte; Program, H. K. Dickinson, Montana Power Co.; Ladies' entertainment, Howard Gemberling, Montana Power Co., Great Falls; Reception, Carl Smith, City Electrical Inspector, Butte; Inspection trips, J. P. Medlin, Montana Power Co., Great Falls; Photographs, H. C. Henderson, Bell Telephone Co., Great Falls; Badges, R. J. Kennard, Anaconda Copper Mining Co., Great Falls; Registration, C. H. Kirk, Montana Power Co., Great Falls; Booster, E. J. Riley, Graybar Electric, Butte; Golf, H. P. Piggott, Montana Power Co., Great Falls. Secretary of local committees is L. D. Brewer, Montana Power Co., Great Falls.

Case Delay

Bay area contractors get another Federal reprieve

Delayed again at the request of the Federal government was the case against the San Francisco and Oakland electrical contractors indicted as a part of the nationwide investigation of the building industry. Earlier weakness of the Federal case was indicated by a dismissal of the original indictment and a re-indictment after the filing of a demurrer by the counsel for the contractors. Two subsequent California cases will evidently be delayed until a precedent is established in this case.

Southern California Hit

Second to feel the indictment whip of the antitrust campaign in California were the Santa Barbara and Harbor District chapters of the National Electrical Contractors' Assn. Indicted also were the San Pedro unit No. B83 and Local 413 of the International Brotherhood of Electrical Workers at Santa Barbara. Specific nature of the charges are similar to those returned against the San Francisco and Oakland associations.

● THE NATIONAL HOUSEWARES DIRECTORY for 1940 is just off the press. This new issue, published by the Associated Pot & Kettle Clubs, is in its ninth edition, and is presented to 4,000 major housewares buyers throughout the United States for their reference service. Besides the Associated Pot & Kettle Club directory, the names of hundreds of manufacturers and sales representatives are included.

● SACRAMENTO ADEQUATE WIRING BUREAU at its last meeting voted to become the Sacramento division of the Pacific Coast Electrical Bureau, Northern Division. Closer tie-up with the adequate wiring movement is anticipated by this affiliation.

In attendance at an inaugural meeting of maintenance engineers (see column 3) were (seated) Rex Glasscock, Carl Davidson, L. Bruun, John G. Hayes, John Cordelair. (Standing) F. J. Brumund, H. W. Goldsmith, J. C. Cochran, J. V. Jervis, Charles L. Border, Ray Wolf, W. A. Weber

New Group

San Francisco & Oakland maintenance engineers organize

Maintenance engineers in the San Francisco area got off to a good start in the organization of an electrical maintenance engineers association last month when the initial meeting was held and officers elected. Fourteen maintenance engineers from San Francisco industrial plants and office buildings met for the original organization meeting. H. W. Goldsmith, chief engineer of the Adam Grant Building, was elected president. Charles L. Borden, engineer for the Tilden Sales Building, was elected vice-president; and J. C. Cochran, assistant engineer of the Adam Grant Building secretary-treasurer.

The second meeting of the organization had as its speaker G. M. Simonson, consulting electrical engineer, who describes the proposed photo-electric relay control system which he has designed for an Oakland bank building. There were 25 present at this meeting. Constitution and by-laws also were adopted. Committee appointments were set for the next meeting.

● IN A LOOSE LEAF BINDER, the San Francisco Electrical Contractors Assn. has issued to each of its 120 members, a complete set of mimeographed bulletins of the Department of Electricity. These bulletins pertain to interpretations of the local Code and rulings as to new equipment such as fluorescent lighting, in-built fixtures, etc.

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For example, we designed special jigs to make sure that the mounting supports are welded to *each* tank in *exactly* the right position. We installed equipment that made it possible to weld the bushing pockets and the base to the tank with overlapping electrical stitches, assuring permanent tightness. We invested in many other machines—machines not necessary for building merely acceptable tanks, but vital in the production of a superior product.

The result is the most modern, best equipped distribution-transformer tank shop in the world, geared for a continuous flow of attractive, thoroughly reliable tanks. It is an important factor in our constant endeavor to provide better transformers at the lowest possible cost to the purchaser.

GENERAL ELECTRIC

402-1

Unusual Test

On Eastern Utility System Proves Value of Capacitors

Power Company Gained 3300 kva of Needed System Capacity for Only $12.85 per kva

HOW THE TEST WAS MADE

To find exactly what effect was obtained from 5520 kva of G-E Pyranol capacitors installed to relieve its system of reactive kva, a large Eastern utility recently made a system-wide test involving every one of its 51 separate capacitor installations.

Linemen were stationed at each installation, and at a prearranged time all of the capacitors were disconnected from service for a period of 10 minutes. Station and substation attendants took the readings necessary to determine the increase in kva of system load with the capacitors disconnected.

WHAT THEY FOUND

By tabulating the readings, the power company engineers found that system kva loading jumped 3300 kva when the capacitors were taken out of service. In other words, each capacitor kva in service was releasing 0.6 kva of system capacity for revenue production. On the basis of the total installed cost of $7.71 per kva for the capacitors, this meant that the power company obtained needed system capacity at the remarkably low cost of $12.85 per kva.

OTHER ADVANTAGES OF CAPACITORS

In the careful study that preceded this installation, the power company engineers found that other factors besides low cost favored the selection of capacitors. For example, capacitor kva could be installed in small or large blocks at strategic locations to obtain the maximum benefit for the dollar invested. Capacitors could be installed easily and quickly — in this case, only 14 working days were required.

CAPACITORS PROFITABLE FOR YOU?

On your system—probably in a number of locations—lie opportunities for the profitable application of G-E Pyranol capacitors. They help, at low cost, to solve the problem of increasing feeder, substation, and generating capacity, with better regulation and lower losses. It will pay you to investigate this economical, reliable means of gaining capacity. Ask your G-E representative about Pyranol capacitors or write for Bulletin GEA-2746, "Pyranol Capacitors for Central Station Applications." Address General Electric Co., Dept. 6A-201, Schenectady, N. Y.

HOW RELIABILITY IS BUILT INTO PYRANOL CAPACITORS

G-E Pyranol capacitors are carefully checked after each manufacturing operation — for example, the check for capacitance illustrated at the left. This test constitutes a check and double check on the correctness of winding and assembly, and picks out any flaw previously undetected. Thorough testing is a major factor in the operating record of Pyranol capacitors — 99.8 per cent perfect.

GENERAL ELECTRIC

360-150

Sure there are WESTONS for those special measurement needs!

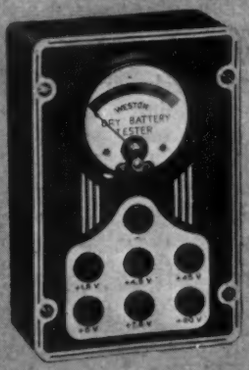
HERE are just five of them. WESTON makes many more. Each designed to meet some particular measurement problem . . . make test procedure simple . . . less time-consuming . . . more efficient. Remember this whenever you are faced with some new or unusual measurement problem. Better yet . . . investigate these WESTON instruments *now* . . . for chances are that one or more will exactly meet your *present* needs. Consult the WESTON representative in your vicinity, or write Weston Electrical Instrument Corporation 577 Frelinghuysen Avenue, Newark, N. J.

AC Clamp-Ammeter—a real time saver. Simply hook the jaws around the conductor while machinery is running, and take the current reading. No production interruptions as circuits are never disturbed. Rugged construction, with high insulation. Six current ranges answer all maintenance needs.

Ultra High Frequency Oscillator—for checking and testing all types of communication equipment and carrier current systems operating in the high frequency bands. Has fundamental frequency coverage from 22 to 150 megacycles. Tests can be made with or without direct wire connection. Employs continuously variable inductive tuning, which provides high order of stability and resetability over entire range. Extremely portable, measuring only 8" x 8" x 11"—self contained power supply.

Hand-size AC Maintenance Voltmeter—has double range of 600 and 300 volts with push button switch for range selection—sensitivity 1000 ohms-per-volt. Case made of sturdy Bakelite with rotatable metal cover to protect instrument from rough handling. Has heavily insulated rubber covered leads and rubber sleeved test clips. Ideal for installation and maintenance testing of power and lighting circuits.

Industrial Circuit Tester—provides new convenience in testing signal, control and electronic circuits. Has 27 voltage, current and resistance ranges. High sensitivity for testing photo-cell, vacuum tube and relay circuits, and other plant maintenance and production requirements.



Pocket-size Dry Battery Tester—Measures "cut-off" voltages under proper load conditions. Ideal for checking dry batteries used in manufacturing or industrial control circuits. Ranges for testing batteries of following voltages . . . 1.5—4.5—6—7.5—45 and 90 volts.

WESTON *Instruments*

WESTERN REPRESENTATIVES

Seattle, Wash.
Eicher & Bratt,
263 Colman Bldg.

San Francisco, Calif.
Herman E. Held,
420 Market St.

Los Angeles, Calif.
A. A. Barbera,
Subway Terminal Bldg.

Denver, Colo.
J. W. Van De Grift,
623 Charles Bldg.

Phoenix, Ariz.
J. E. Redmond Co.,
448 W. Madison St.

Office Lighting

Puget Sound Power combines fluorescent with indirect

LIGHTING at the Puget Sound Power & Light Co. general sales office, combines fluorescent supplementary lighting with indirect incandescent. Fluorescent lamps have solved a heretofore difficult problem of providing high levels of lighting on the line-a-time without direct or reflected glare and with a minimum of obstruction to vision and desk top areas. Specially designed para-cyl type reflectors with 18-in. white fluorescent bulbs provide 80 to 100 ft. candles on the reading area of the line-a-times. Specular alzak reflectors of high efficiency are used with high power factor capacitor auxiliaries.

A relatively high level averaging 35 ft. candles of indirect lighting is obtained using 750-watt mirror glass units on 10 ft. x 12 spacing. This provides good general visibility throughout the office and relieves the contrast of the brightly lighted line-a-time with a maximum of visual comfort. Stenographic line-a-times which involve one of the most difficult visual tasks in the office, usually have about one third of the average lighting level on the horizontal plane even with the best of conventional system. The supplemental fluorescent units reverse this with three times the average lighting for this difficult visual task. Stenographic workers report a noticeable increase in transcription speed, reduction of erasures and retypes, and much less fatigue at the end of the day. Visibility of the multigraph stencils is particularly improved.

Following are lighting intensities obtained in various parts of the office: general lighting level at desk level, 36 ft.-candles; at file tops—upper files, 32 ft.-candles; lower files, 20 ft. candles; on desk top work areas, 40-60 ft.-candles; on typewriter—at roller, 90 ft.-candles; on line-a-time, 80 to 100 ft.-candles.

● "SEEING", a booklet of popular distribution on the science of seeing prepared by the Western Institute of Light and Vision, Los Angeles, has been revised for 1940 distribution. Upwards of 1,000,000 copies of the pamphlet have been issued since it was prepared under the direction of Frank A. Hansen, director of the institute. Text has been rewritten, several new illustrations added and a 32-page format adopted. Unit prices are based on quantity, ranging from 25c per copy for 1 to 10 copies to 3½c per copy for quantities in excess of 100,000 copies.

Stenographers for Puget Sound Power & Light Co. work under excellent lighting conditions

Attention-Getter

Utah Power division store attracts with light

New electrical signs have been installed on the front of the new Utah Power & Light Southern division store at Orem, Utah, calling attention to passersby to the fact that they should enjoy "Cheap Electricity." One of the

signs, of the upright type, is 16 ft. high, and extends 8 ft. above the top of the building. The word "Electricity" in red letters on a white background runs nearly the length of the sign.

Just underneath is the company name in black and white, and along the entire store front is a horizontal sign in green and black. This office is located along the main highway, and is just opposite a stop sign, which makes certain that the signs are seen by motorists.

Voltage Drop Tables

PCEB issues new bulletin for contractors

Voltage drop is simplified in the tables furnished the trade by the Pacific Coast Electrical Bureau, Northern Division, in its adequate wiring bulletin No. 1. Instead of thinking in percentage of voltage drop, the overall drop in branch circuits and feeders are required not to exceed two volts.

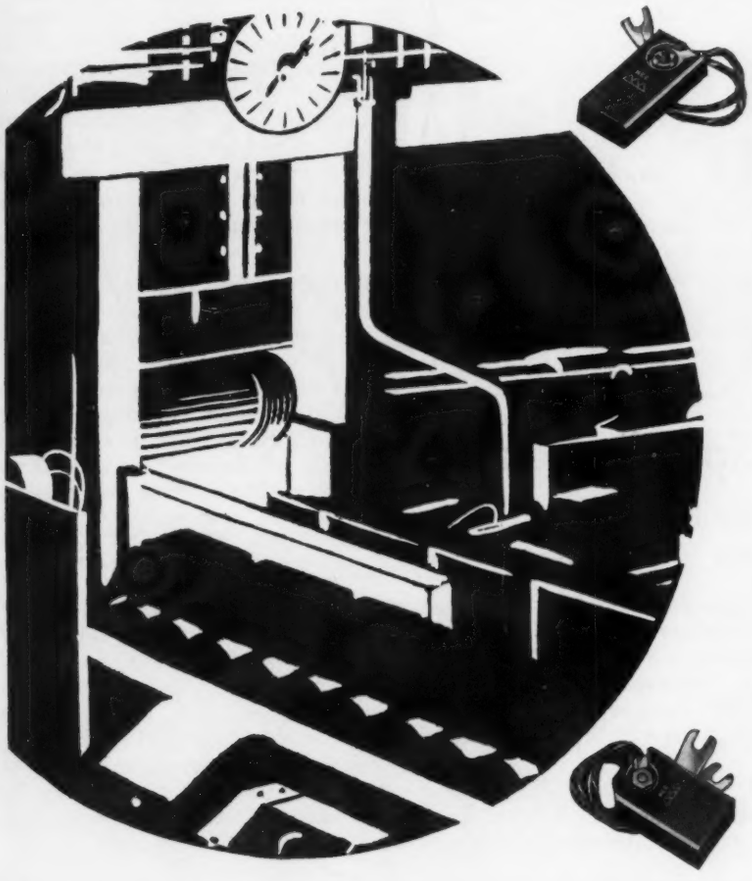
These tables therefore are computed for maximum length of run to provide one-volt drop in the run, allowing another volt drop in the feeder. Capacity per outlet for commercial installations is recommended at 500 watts or more and wattage for any given area at 8 watts per sq. ft.

The bulletin states "This allows only a small margin of safety over the 5 watts per sq. ft. which is now common practice. If flourescent or other gaseous type of lighting comes into general use, intensities of *from 100 to 200-ft. candles* may soon become accepted standards. If this takes place, 8 watts per sq. ft., even with 230-volt lighting circuits, will barely provide adequate wiring."

These tables are designed to make it easier for contractors to compute adequate wiring installations.

IMPROVED RELIABILITY

ON STEEL MILL DRIVES



To offset the effects of vibration specify **RUBBER PRESSURE PADS** on holder end of brushes.

AND OTHER CLASSES OF SERVICE WITH

NATIONAL
TRADE-MARK

CARBON BRUSHES

● Adaptability of the product to the service on which it is applied is the key to reliability of performance. "National" Carbon Brushes are designed for adaptability to specific machine characteristics and service conditions. There are several "National" grades designed specifically for the conditions encountered in steel mill service.

Recommendation of the preferred grade by the technical staff of National Carbon Company, Inc. is based on the knowledge gained by exhaustive study of the problems of brush application.

FOR IMPROVED RELIABILITY, SPECIFY

"NATIONAL" Carbon Brushes.

There is a "NATIONAL" brush grade adapted to YOUR needs.

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All-Electric Home

Electrical League of Utah emphasizes adequate wiring

An all-electric home designed to emphasize the importance of Adequate Wiring, modern electric kitchens and the use of complete electrical service is being constructed by the Electrical League of Utah.

The program is under the guidance of Paul J. Devine, chairman of the League's activity committee, and is being constructed in a popular building area on the east bench of Salt Lake City. When completed the building will display adequate electrical wiring, following the minimum requirements for Certified Electrical Wiring as set forth by the National Adequate Wiring Bureau.

Throughout the entire building, electrical conveniences will be the theme with electric range, water heater, refrigerator, automatic coal stoker, furnace fan, disposal unit, dishwasher, ironer, etc., as well as correct lighting and wiring being featured.

One of the biggest problems of the League's Adequate Wiring representatives has been contacting prospective home builders before all home planning details and financial arrangements have been completed. It was considered imperative, therefore, that a project of this type be launched which would attract people contemplating building and which would forcefully illustrate the necessity of incorporating Certified Adequate Wiring in their planning.

Plans call for extensive promotion that will include newspaper advertisements, radio announcements, signs placed at strategic points throughout Salt Lake City directing people looking for homes to the location of the modern electrical home, erection of a large sign in front of the residence illuminated at night, floodlighting of the house and the presence of competent League reprsentatives to direct people through and call attention to the electrical features.

● REVISION of the Handbook of Interior Wiring Design to bring it up to date with the 1940 edition of the National Electrical Code is in charge of an industry committee headed by R. G. Slauer, Westinghouse Electric & Mfg. Co., 160 Broadway, New York City. Suggestions, comments, and criticisms regarding the handbook text, the material covered, and the method of presentation are solicited from anyone in the industry.

Reasons for Power Factor Correction

(From Bulletin No. 16, Dept. of Electricity, City and County of San Francisco)

Where lighting equipment of the above type is installed on lighting services, and said equipment operates at low power factors (approximately 50%), the line currents required are double the amount that are required for the same connected loads operating at unity power factor. These increases in current result in the doubling of the number of circuits and increasing the sizes of meters and service switches and conductors. Power factor correction not only permits an increase in the number of outlets on each circuit, but decreases the current per circuit for the same wattage requirement, which results in less voltage drop, increased efficiency, and increased illumination from the same fixture.

AW Specifications

Utah committee publishes streamlined wiring folder

"Streamlining" of the Adequate Wiring specifications of the Electrical League of Utah has recently been completed and published in an attractive six-page folder by members of the organization's Adequate Wiring committee.

Entitled "Home Wiring—The Electrical Road to More Convenient Living," the pamphlet presents the minimum Certified Adequate Wiring requirements for the territory served by the League and points out the usefulness and conveniences of including Adequate Wiring in the new home.

The pamphlet will be used as a promotional piece as well as a specification, according to chairman L. B. Johnson, and through the reduction of the minimum requirements it is believed it will make it possible for a greater number of new home builders to include a certified job.

A floor plan, typical of residences in the locality served by the League, a list of "Recommendations" which asks the home owners to consider carefully the additional installations that will add even greater ease and enjoyment through the use of cheap electricity and, finally, putting forth an invitation to take advantage of the League's free Planning Service, are included.

● SAN FRANCISCO JUNIOR CHAMBER OF COMMERCE took first place in the California contest between Junior Chambers of Commerce for its safety in transportation committee work. It won the "Safety With Lighting" cup and the Traffic Safety cup. J. Graham McCormack, of Pacific Gas and Electric Co., was chairman of the San Francisco committee. A new campaign for 1940 started on May 8th.

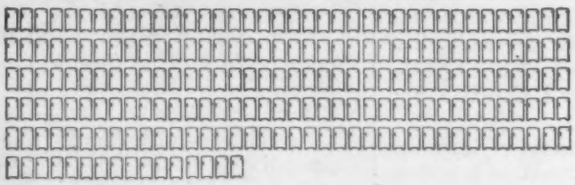
● I. R. JOHNSTON is expecting an all-night audience after the opening of the Johnston Electric Co., at Coeur d'Alene, Wash. The store is completely lighted with fluorescent units, both in the center of the showroom and in the display windows. Johnston plans to use this unusual lighting all night as he feels it attracts attention, and will assure him a continued audience.

RACKS UPON RACKS of luscious colored lamps are being constantly filled, tested and emptied at the General Electric Fluorescent Lamp Works, Nela Park. Twelve thousand lamps a day are passing through this "aging" test. Foreign gasses are cleaned up and lamps leveled off

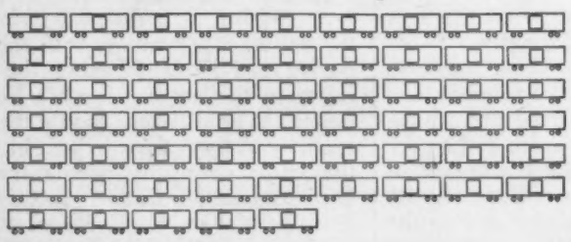
WORLD'S LARGEST REFRIGERATOR FACTORY PRODUCING AT FASTEST PACE IN HISTORY

A NEW FRIGIDAIRE
Every 17½ Seconds

206 FRIGIDAIRES *Per Hour*



59 CARLOADS *Per Day*



Glance at your watch . . .

Before the second hand makes one revolution, more than three new Frigidaire Refrigerators come off the assembly line! 206 per hour!

Frigidaire dealers and salesmen are making sales history. And to meet their unprecedented demands for more and more products, Frigidaire is breaking every production record!

An average of 59 *carloads* of Frigidaire products leave the plant every working day!

What better proof that the world's largest refrigerator factory is geared to the needs of its selling organization!

FRIGIDAIRE DIVISION
General Motors Sales Corporation, Dayton, Ohio

IT IS FRIGIDAIRE FOR '40!

NEWS OF THE INDUSTRY

BREATHER GRANTED S. F. IN HETCH HETCHY CASE

Secretary of Interior Ickes agreed last month to grant San Francisco the Hetch Hetchy power "breathing spell" which two delegations went to Washington to get.

Having agreed to it himself, he set in motion the steps which will pave the the way for Federal District Judge Roche to d othe same thing legally and officially.

The Secretary told the time-seeking San Franciscans at their second group gathering of the week that he would not stop sale of electric energy to Pacific Gas and Electric Co. prior to Aug. 1, on condition that San Francisco as a municipality to take steps at once to negotiate with PG & E a new lease contract containing an option to purchase power distribution facilities in the city.

Utilities manager Cahill, who already has been in conference with PG & E president James B. Black on the matter, assured Secretary Ickes he would launch conversations at once with this end in view, and City Attorney O'Toole added that he would draft, upon his return to San Francisco, a proposed amendment permitting submission to the electorate of a revenue bond issue to meet the situation.

Word of the "breather" was hailed locally as a signal achievement, despite creation of a new problem among the budget makers in San Francisco.

The city, now must file with Federal Judge Roche an application for stay of the mandate of the United States Supreme Court ordering cessation of power sales to PG and E.

Naturally, official legal comment was withheld pending receipt here of the Supreme Court mandate, but unofficially, there was unanimity of thought that no objection would be interposed.

The immediate problem confronting the city's budget makers arose from the necessity of ear-marking $65,000 for a special election on a charter amendment. Secretary Ickes requested that it be held not later than Sept. 15, if possible. He was told an effort would be made to meet that deadline, although it would "take time" to work out a plan with the PG and E. He was told also that the State Legislature also would have to act on validity of a charter amendment, despite usually routine acceptance of such proposals and that Legislature could not consider the matter prior to next January.

Boo !

Blackface or blackout, this comely miss at the San Diego Bureau Spring Fair is taking it easy. Needless to say, she drew quite a crowd.

SLIGHT DAMAGE TO UTILITY PROPERTY IN QUAKE

Less than $2,000 damage was inflicted on electrical facilities of the Nevada California Electric Corp. in Imperial Valley by the severe earthquakes which rocked that region of southern California on the night of May 18, according to F. O. Dolson, vice-president and general manager of the company. The quake damaged many buildings in Brawley, El Centro and Calexico and resulted in eight deaths.

There were some service interruptions but all were restored in less than an hour except in those communities where power was turned off at the request of authorities so as to prevent possible fires. Relays were tripped in several substations but after the first shocks, functioned normally. Large transformers were moved as much as 18 in. on their foundations and in one case a regulator was tipped over; however, it was prevented from falling by the holding of its leads and was operating satisfactorily when discovered.

Major loss to the utilities serving the area may come from damage incurred by the extensive irrigation facilities in the valley. Without water, some crops may be lost. Hence several of the large processing plants, including pre-cooling and refrigerating, may be shut down with resulting loss of energy sales.

PORTLAND CITIZENS SAY NO TO PUBLIC POWER

Six out of seven PUDS voted on in Oregon May 17 failed to pass. Final vote on the important Portland election was 68,973, no, and 30,278, yes. Only a small district in the Nehalem Basin, west of Portland, including the city of Veronia, showed a favorable majority.

PUD proposals in Washington and Yamhill counties, both served by Portland General Electric Co., were substantially defeated. In Washington county, 50 precints complete but unofficial give 4,835 against to 4,099 in favor. The district failed both in the cities and the rural areas. In Yamhill county the final count was 2,108 against to 1,861 in favor. Rural areas voted in favor of the district by a margin of 110 votes, but no district can be formed in the rural area of the county in view of the unfavorable majority in the district as a whole.

Lincoln county, served by West Coast Power Co. and Mountain States Power Co., defeated the PUD proposal 1,547 against to 1,238 for. The city of Newport, largest town in the county, went in favor of the district by 40 votes. Other towns went against.

Coos county, served by Mountain States Power Co., turned down the proposal with a vote 5,017 against to 2,922 in favor, cities and rural areas both returning substantial majorities against. The proposal to add the cities of Wheeler and Nehalem in Tillamook county to the already formed Tillamook district, also in Mountain States Power Co. territory, likewise was unfavorable. The small isolated Sand Lake rural area, adjacent to the Tillamook district, voted to add itself to the Tillamook PUD.

Voters Protest

As a protest against the type of men proposed for PUD directors printed on the ballot, many voters, both those opposing and those favoring the PUD, wrote in the names of other Portland citizens to be directors should the measure pass. Among these written in names, the following utility people from the local companies figured prominently: Paul B. McKee, L. T. Merwin, James H. Polhemus, Franklin T. Griffith, John A. Laing, Lewis A. McArthur, George E. Sullivan, O. B. Coldwell, J. C. Plankinton, George Sullivan and John D. Scot. Also included in these write-ins were other business men, bankers, industrialists and atorneys.

For the First Time Anywhere

GENERAL ELECTRIC IRON and IRONING BOARD COMBINATION DEAL APRIL 1st to JULY 1st

G-E "DIAL-THE-FABRIC" AUTOMATIC IRON (Cat. No. 119F114) $8.95

G-E "MET-L-TOP" IRONING TABLE (Cat. No. 78X512) $5.95

Total Value $14.90

LIMITED TIME OFFER

BOTH FOR $9.95

WITH YOUR OLD IRON

PRICE $11.95 WEST OF THE ROCKIES

G-E "DIAL-THE-FABRIC" AUTOMATIC IRON

1. Streamlined.
2. "Dial the fabric" heat control.
3. Compensating thermostat.
4. Moulded handle and thumb rest.
5. Fast heating Calrod unit produces even soleplate ironing temperature.
6. Button nooks to save buttons.
7. Chromeplate finish, attractive, durable.
8. Heel rest to save lifting.
9. Long-life cord set, moulded rubber plug.
10. 1000 watts for faster ironing.
11. Weighs only 4½ pounds.
12. List price $8.95.

G-E "MET-L-TOP" IRONING TABLE

1. All metal—will last a lifetime.
2. Lightweight—warp-proof—fireproof.
3. Vapor-vented—vents carry off steam and aid in faster ironing.
4. Patented folding legs—fold easily without adjustment.
5. Rigid construction—standard size.
6. List price $5.95.

COMPLETE ADVERTISING PROGRAM

THIS OUTSTANDING OFFER is backed by a complete advertising program which includes: Broadside, Cat. Pages, Folders, Handbills, Pennants and Newspaper Ad Mats.

•

See your G-E Distributor at once to tie in with this complete merchandising offer.

GENERAL ELECTRIC

BRIDGEPORT, CONN. ONTARIO, CALIF.

Immediately following the election, several interested people made public statements. Ormand J. Bean, Public Utility Commissioner of Oregon, urged that the two Portland utilities consolidate so as to eliminate duplicating facilities and effect such economies as this elimination might make possible. Harry M. Kenin, chief PUD proponent, stated that the people might prefer municipal ownership and indicated he might promote such a proposition for the November election.

Dr. Paul J. Raver, Bonneville Administrator, said "As I stated emphatically before the election, the problem of how the electric system in Portland shall be owned and operated is a local problem that must be decided by Portland people themselves.

"Before the Bonneville power administration can make satisfactory long-range plans for bringing the benefits of Bonneville power to Portland it is very important that we have a definite answer from the voters of Portland on this point.

"In view of the fact that a great part of the opposition to a PUD seemingly was based on a preference for municipal ownership, the question of private vs. public ownership can hardly be said to be settled."

Willis K. Clark, treasurer of the Citizens Committee against the PUD, expressed amusement at the "alleged neutrality" of Dr. Raver, and said, "So far as this committee is concerned the campaign was undertaken and waged with that sincerity of purpose and devotion to our community which always characterize our citizenry once they are aroused. . . . I have been surprised and pleased with the wholehearted support that the committee received financially, and particularly the large number of small contributions from all quarters."

Puget Sound to Continue Service in Ellensburg

Indicating that the Puget Sound Power & Light Co. will not give up its Ellensburg (Wash.) private power service without a struggle, the company has requested a meeting with city officials to discuss a new contract for electric power. The company has been supplying the city with standby service for the past ten years, which service is now being sought by the Bonneville Administration.

The latter submitted a contract proposal to the city council recently, asking that a decision be reached before June 30, in order that money now available could be allocated for construction of a transmission line from Midway in Yakima County to Ellensburg, and for the construction of a substation.

Use More
DROP FORGED
Pole Line Hardware And Obtain ★

1 Plus Strength in Lighter Sectional Thickness.
2 Uniform Physical Structure, Size and Shape.
3 Freedom from Concealed Defects.
4 Extra Margin of Safety.

Forgings offer many direct and indirect economies. Consult makers of drop forged pole line hardware.

DROP FORGING ASSOCIATION
605 HANNA BUILDING • CLEVELAND, OHIO

Court Sets Valuation of Whatcom County PS Property

The actual value of properties of the Puget Sound Power & Light Co. in Whatcom County, Wash., has been set at $2,750,000, in the condemnation suit against the company now in progress in the Federal Court in Bellingham. E. K. Murray, Whatcom County Public Utility district attorney, set this figure in his introductory statement, in which he estimated that the properties cost roughly $4,250,000 to build, and that they had depreciated 40 to 50 percent.

Attorneys were warned by Federal Judge John C. Bowen to omit some of the detail and speed up procedure in the suit. PUD attorneys declare that the big question in the suit will be the matter of severance—the company claiming that severance of the Whatcom County distribution lines will cripple the entire system. The PUD claims that these properties are merely a terminal portion of the company's lines and that their acquisition by the PUD will not affect the rest of the system, because if the district acquires the properties, it will still be available as a customer to take power from the company at wholesale.

The condemnation suit is the second of its kind in the state of Washington, following the recent jury decision placing a price of $6,000,000 on the properties of the Washington Gas & Electric Co. in Cowlitz and Lewis Counties.

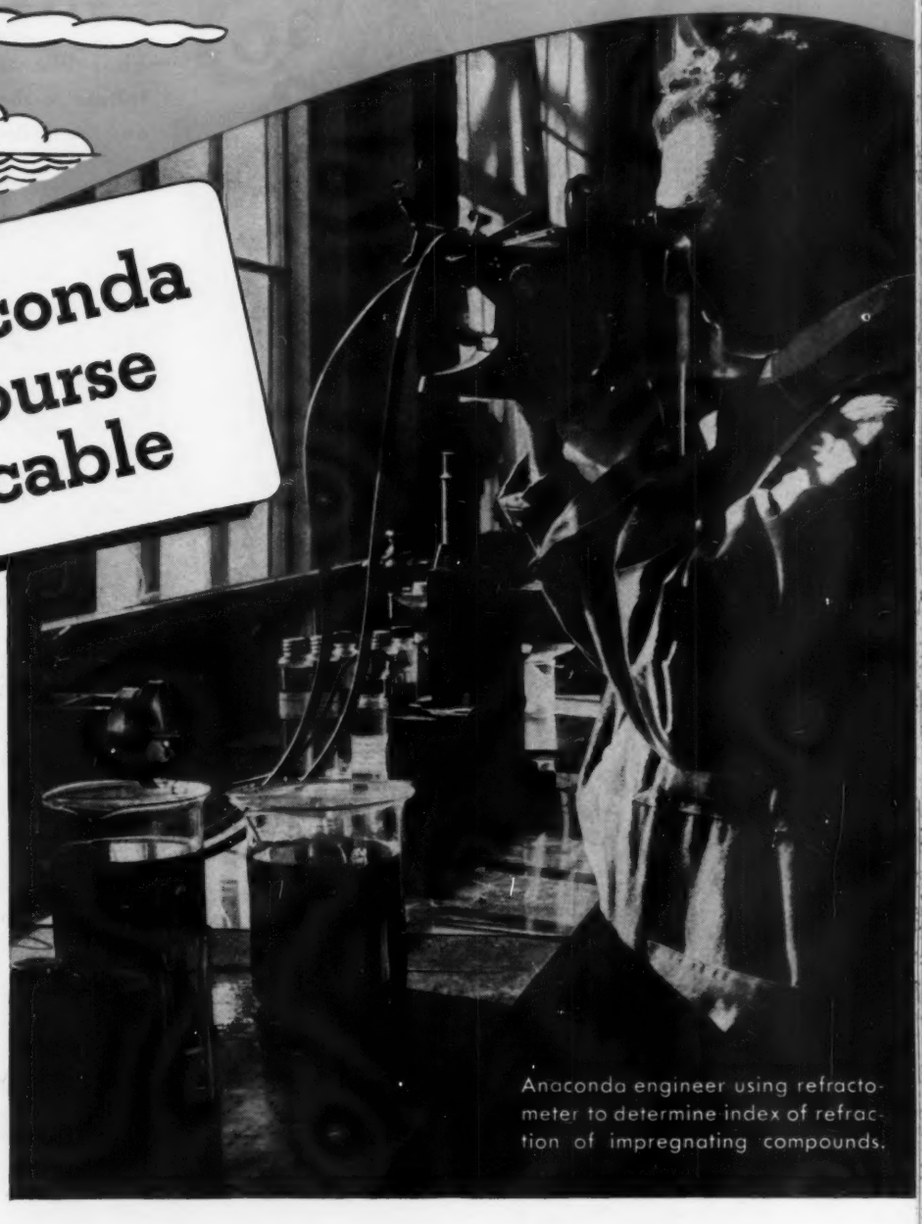
California Contractors Hearing Date Set by Court

Date of hearing of arguments on the demurrer filed by the counsel for the Electrical Contractors Assn. of San Francisco and the local union No. 6, I.B.E.W. and of Oakland association and union, was set for June 10 by Judge Roache of the Federal Court in San Francisco. At that time the demurrer will either be denied or sustained, the case going to trial in the former instance, or being dismissed in the latter. Fundamentally important point at issue is whether Federal jurisdiction extends over what is claimed to be purely intrastate business and organization. The case is being watched as a real test of the legality of the drive on the construction industry by the Department of Justice.

Meanwhile the two other California groups of electrical contractors, indicted, in Long Beach and Santa Barbara, are being importuned to accept consent decrees — tacitly admit guilt which they declare privately does not exist, agree "not to do it again," and save themselves expensive legal battle to establish their rights.

The Industrial Navigator

One way Anaconda checks its course to superior cable



Anaconda engineer using refractometer to determine index of refraction of impregnating compounds.

THE roles of the ship's navigator and the laboratory engineer are not much different for both must keep close control of their charges or else neither ship nor product will reach its goal successfully. Curiously, the instruments they use are as similar as their duties. In the laboratory, however, the sextant is a refractometer.

Through the use of the refractometer Anaconda engineers keep watch for deviations from their strict quality control system. This is but one of many tests employed in the study and observation of impregnating compounds. And if they can't pass the scrutiny of the refractometer, out they go.

Such painstaking precautions typify Anaconda's methods of bringing its customers wire and cables of unimpeachable quality.

ANACONDA

Visit the Copper & Brass Industry Exhibit in the Hall of Industry, New York World's Fair—1940.

A WIRE AND CABLE FOR EVERY ELECTRICAL REQUIREMENT

The Anaconda line is complete, including standard and special power cables, rubber-covered wire, magnet wire and coils. Each product has benefited from Anaconda's continuous development and research program.

USE MODERN IMPROVED **Anaconda Wire & Cable**

ANACONDA WIRE & CABLE COMPANY, General Offices: 25 Broadway, New York City; Chicago Office: 20 North Wacker Drive

Subsidiary of Anaconda Copper Mining Company. Sales Offices in Principal Cities

THE STORY

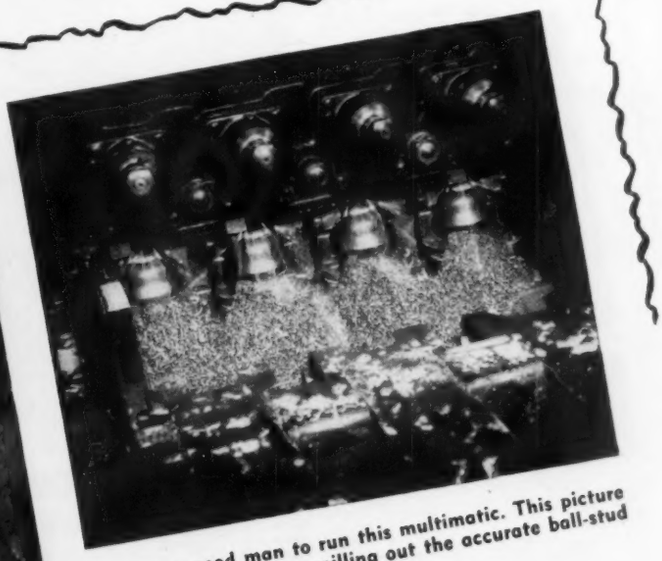
The public reads of a great power project and justly pays tribute to the genius of the engineers who designed it and the daring of the men who built it.

It is only natural too, that we are proud of the hi-line hardware we have placed on these jobs.

But behind this pride and these headlines are the men of unsung glory – drop-hammermen, die-sinkers, and a host of others that make it possible to deliver these forgings. The next time you handle a BTC forging, think of the number of skilled craftsmen it took to produce.

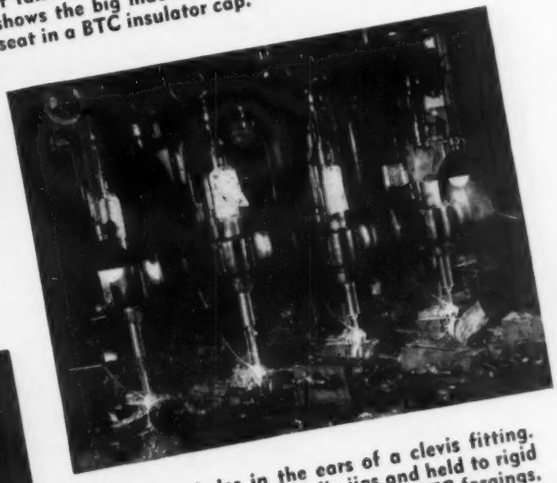
More Than A Forging—A Service

BEHIND THE HEADLINES

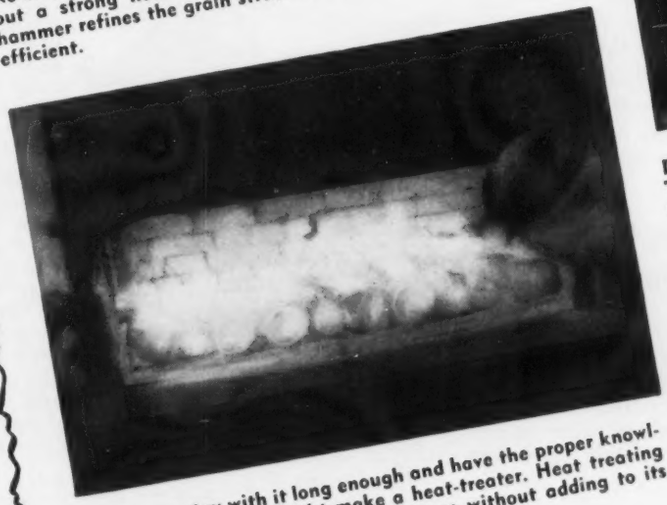


It takes a good man to run this multimatic. This picture shows the big machine milling out the accurate ball-stud seat in a BTC insulator cap.

No easy job this one. Not only skill and experience is required, but a strong healthy body. The constant pounding of the hammer refines the grain structure of the metal. Noisy — but efficient.



Drilling the holes in the ears of a clevis fitting. They are drilled in hydraulic jigs and held to rigid specifications. No spot loading with BTC forgings.



If you can stay with it long enough and have the proper knowledge of metals you might make a heat-treater. Heat treating increases the strength of the hardware without adding to its weight.

Galvanizing — hand dipped — hand quenched. Smooth — bright — a fine finish on a fine product.

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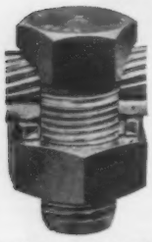

Incorporating a new principle for permanently holding two wires together the tightest way.

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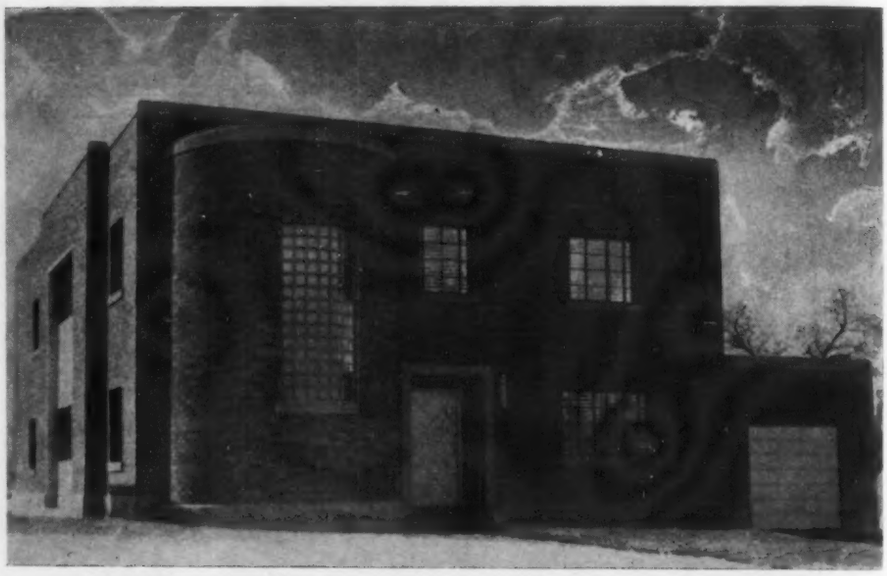
The new distribution center of Utah Power & Light Co. recently completed at Ogden



Utah Power Completes New Distribution Center

Newest electric distribution center of the Utah Power & Light Co., located at Ogden, Utah, has been named in honor of the late Parley M. Parry, commercial manager of the power company for many years.

The new distribution center was recently completed at a cost of $50,000 to provide for normal growth and any extraordinary increase in the power requirements of the southeastern section of Ogden. It is part of the $250,000 improvement program started last July, and continuing this year, for the beautification of city streets in preparedness for the 1947 Utah Centennial.

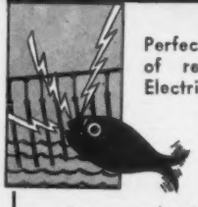
A feature of the new structure is that the electrical equipment is screened, thus giving the appearance of a modern residence.

Grays Harbor PUD Begins Rate Survey

The Grays Harbor PUD, Aberdeen, Wash. has begun a rate survey with a view toward reducing light bills, according to Robert W. Beck, manager. Eric Brundage, rate expert of the Seattle City Light system has undertaken the work, and will have his findings ready for tabulation shortly, including the checking of more than 12,000 customer accounts.

Beck plans expansion of the PUD's engineering and sales department, tentative plans calling for addition of several engineering aides, a survey crew and a draftsman. Beck declares the system's load can be increased up to 25%. Among pressing engineering jobs, Beck said, are planning for facilities to tie the PUD to the Bonneville line into Grays Harbor, increase in voltage the feeder line to the south beach area now served by the Twin Harbors Electric Co., and construction of a loop high voltage line through Grays Harbor's industrial field.

...SOLVES FISH CONTROL PROBLEMS



Perfected after many years of research, the Burkey Electric Fish Screen is a patented device which keeps fish of all sizes and species away from power flumes, irrigation projects, condensing water intakes, etc.

It consists of a portable electric impulse generator, together with flexible electrodes suspended in the water. The device sets up a current which stops—but does not stun or kill fish.

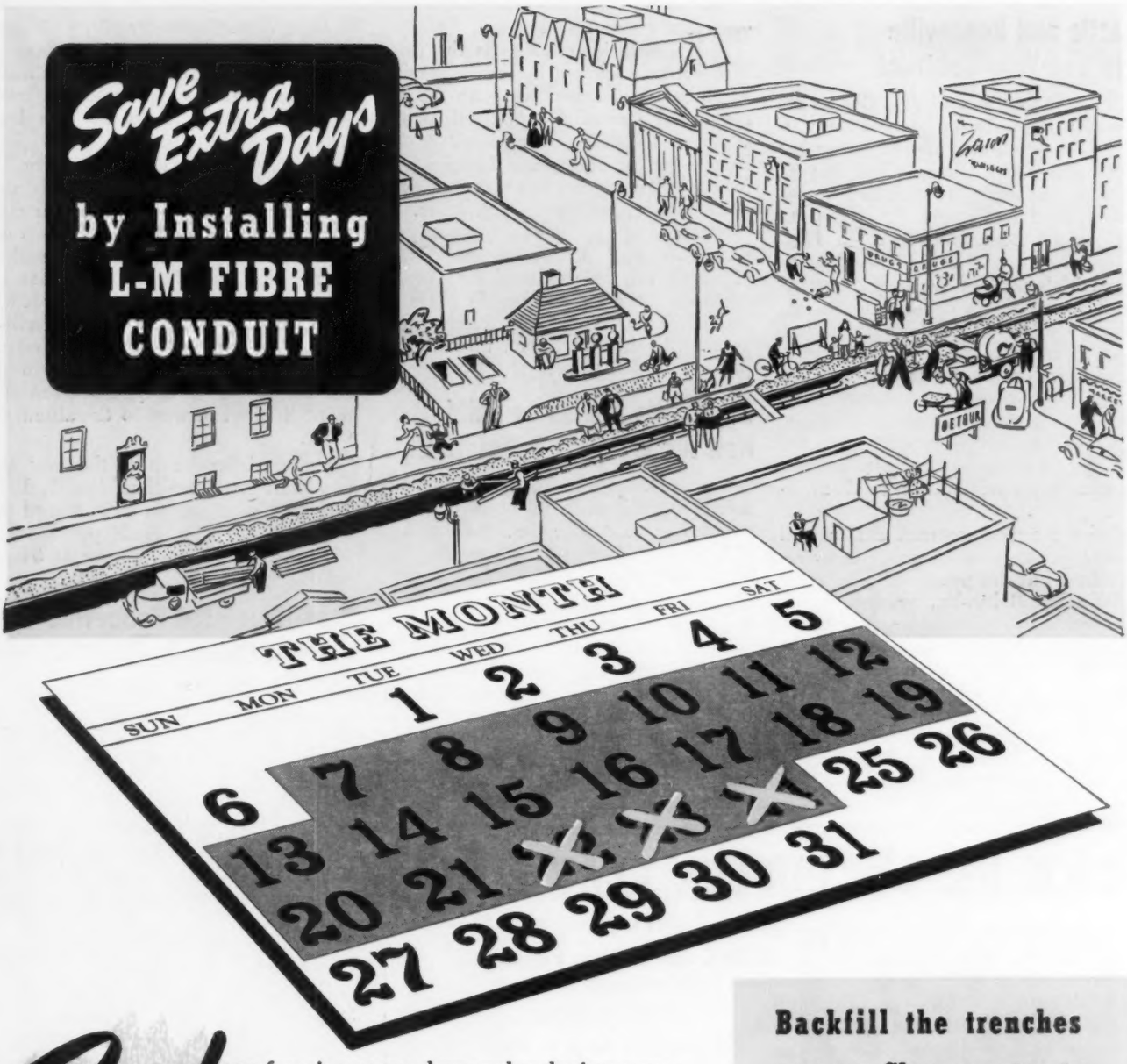
Where metal grids or trash racks are required to keep heavy debris out of turbines, or pumps, frequently such equipment can be utilized as part of the electrode system.

This scientific, modern method of controlling fish electrically can be applied to many fish control problems at a cost far below that of mechanical equipment.

(Send for literature or free estimates)

ELECTRIC FISH SCREEN CO.
1130 N. Poinsettia Place
Hollywood, California

BURKEY ELECTRIC
FISH SCREEN



Proof of saving extra days and reducing costs, is in the installation of L-M Fibre Conduit on your job. As other engineers, who specify L-M Fibre Conduit, you will experience the advantages — it's easy to carry, easy to handle — it lays faster because the length, bore, wall thickness and machined joints are uniform — its strong walls keeps breakage delays at minimum. Tight joints insure against the seepage of wet concrete, therefore the smooth inside surface is always free of foreign matters and the cable can be drawn through the ducts with ease. For economical and permanent protection specify L-M Fibre Conduit for your next underground cable installation.

LINE MATERIAL COMPANY

Backfill the trenches sooner • Clean up streets sooner • Eliminate traffic detours sooner • Complete the job sooner with

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Seattle and Bonneville Sign Ten-Year Contract

City of Seattle and the Bonneville Power Administration agreed May 6 to link their electric power generating and transmission systems. The 10-year contract was signed by Seattle's mayor Arthur B. Langlie and forwarded at once to the Bonneville office in Portland. Power deliveries will begin when Bonneville's western Washington transmission system, now under construction, is built into the Puget Sound area.

An interchange point will be established near Renton, a community on the outskirts of Seattle. Bonneville has agreed to construct a transmission line to this point and a substation in the vicinity of Covington, southeast of Seattle, when appropriations are made available.

Under the new contract, Seattle and Bonneville agree to let either draw on the other's surplus power to the amount of 100,000,000 kw.-hr., accepting payment in kind. Arrangement also is made for additional power deliveries if required. In event of emergency or breakdown on either system each party agrees to supply the other with energy. Both agree to maintain dependable generating capacity and dependable standby power supplies through interchange contracts with other systems.

The Seattle interchange is the third such contract entered by the Bonneville administration. Others are with the Tacoma and Centralia municipal power systems. All three are expected to become effective this year. Tacoma and Seattle already have a contract for power interchange with each other.

Seattle's system has a present generating capacity of 231,556 kw. 30,000 of which can be produced at a steam plant on Lake Union. Seattle plans to expand its hydroelectric development on the Skagit River to an ultimate capacity of 840,000 kw.

Bonneville Begins to Build New Alcoa Power Substation

Bonneville Power Administration last month started construction of a power substation to service the Aluminum Company of America's reduction plant near Vancouver, Wash.

Construction of the four and one-half mile transmission line between Bonneville's north Vancouver substation and the aluminum plant has also begun.

The substation will consist of seven transformers and other electrical equipment. Bonneville surveyors were busy this week staking tower sites for the transmission line.

Fritz Ziebarth, contractor, will begin excavation for steel tower footings in a few days. Ziebarth's contract for labor, equipment and some materials totals $121,912. Work is to be completed within four months.

The new line will carry energy at 110,000 volts from Bonneville's substation bus bar to the aluminum company plant. It is designed so that it can be adapted to serve the industry with as much as 200,000 kw. if expansion should ever require such service. It will folow the right-of-way of Bonneville's already completed Portland circuit from the Vancouver substation to the north shore of the Columbia. From that point it will run west to the aluminum plant.

Power deliveries over the new line will start not later than Jan. 1, 1941. The aluminum company has signed two contracts for the total purchase of 65,000 kw. of prime power at $17.50 per kw.-yr.

Hart Appointed Bonneville General Counsel

C. Allan Hart, Jr., Portland attorney, was named general counsel of the Bonneville Power Administration May 21. Hart succeeds Herbert S. Marks, whose resignation, effective April 1, was announced early in March. Since that time Hart has been acting general counsel.

He has been an Oregon resident since 1911. He is the some of C. A. Hart, head of the law firm of Carey, Hart, Spencer & McCulloch and a graduate of Stanford Univ. and Yale law school where he was an instructor in 1934-35.

He practiced law in Portland in 1935-36, served as assistant United States attorney for the district of Oregon from 1936 to 1938 and acted as special assistant to the United States attorney general at Washington, D. C., until he was appointed Marks' assistant general counsel at Bonneville nearly a year ago.

Appointment of William A. Dittmer as chief of the System Planning and Marketing Division of the Bonneville Power Administration was disclosed last month by Administrator Paul J. Raver. Dittmer succeeds James I. Metcalf, consulting power economist, who resigned March 16 to become consultant for the Securities and Exchange Commission in Washington, D. C.

For a number of years he has served as consultant for several large municipalities, specializing in utility regulation and presentation of evidence in rate proceedings. He comes to Bonneville from Hawaii, where for the past year he has been serving as consultant for the Public Utilities Commission of Hawaii.

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ALZAK ALUMINUM REFLECTORS
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WIRED SOCKETS
SLIP FITTER FOR 1″ PIPE
150-200-300 WATTS

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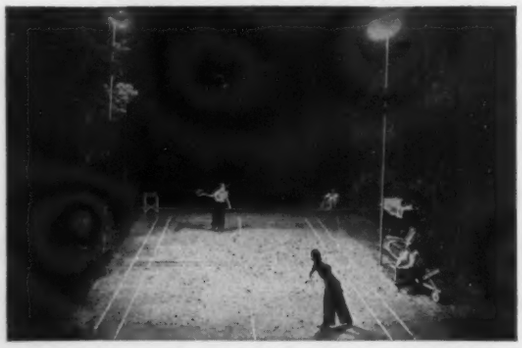
NEW POCKET CATALOG No. 11

No. 808 "Red Cap" Duplex Play-Lite was especially designed for Badminton. It is also ideal for other Home Sports. No Assembly Labor, Nipples, Condulet, Conduit Ells or other fittings. Just loosen two wing nuts, remove "Red Cap" and connect the circuit to socket pig-tails. Easy as A, B, C.

For Badminton and Other Home Sports



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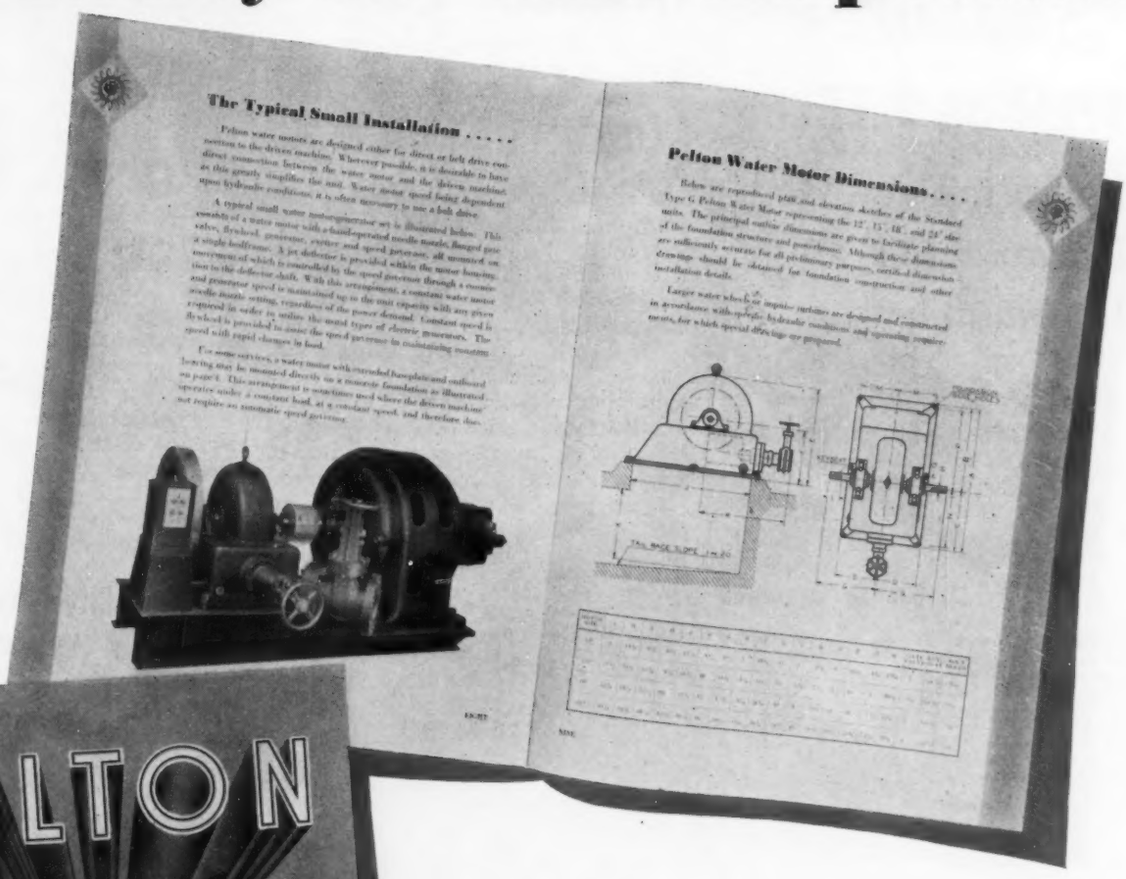

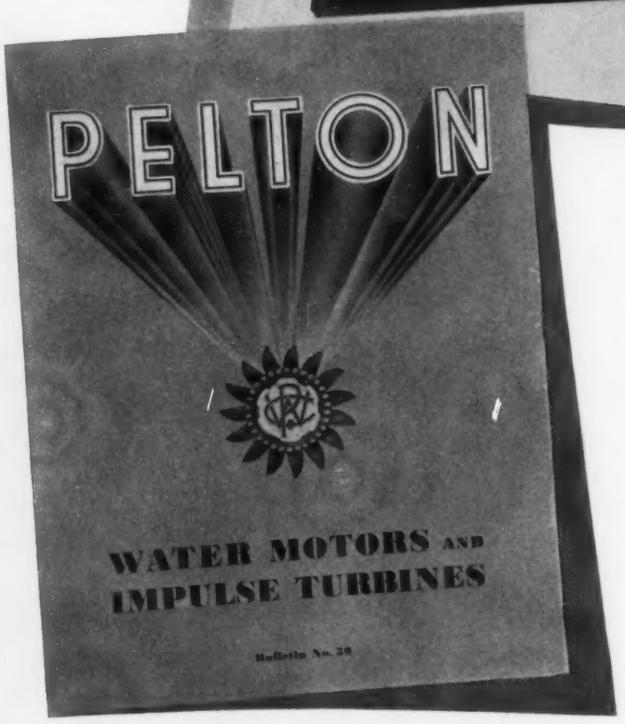

Pelton Bulletin No. 30 Gives Latest Hydraulic and Product Information

Profusely illustrated, completely descriptive, and arranged with dimension sketches and capacity tables . . . a copy of the new Pelton Bulletin No. 30 is ready for mailing to those interested in the design and operation of water wheel units in the standard range up to 5685 horsepower. In addition, illustrations and descriptions of both impulse and reaction turbines are included to show typical construction of the largest hydraulic units. A questionnaire form is enclosed with each bulletin to assist those making preliminary studies of power projects.

Your request for a copy will be promptly complied with.

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Hydraulic Engineers

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Easier to Use..More Durable and Dependable

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For splicing underground cables. Highest quality drawn copper, dead soft annealed. All standard and special shapes and sizes. Free from burrs.

Figure Eight

Extra quality electrolytic copper of correct temper. Seamless and free from burrs.

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Precision made from finest electrolytic copper to N.E.L.A. standards. Carefully grooved to prevent buckling.

Sherman Splicing Sleeves enjoy an excellent reputation in the power industry, for their rugged service qualities. They are made in a variety of styles, to satisfy virtually all cable or wire splicing requirements, and comply with N.E.L.A. specifications.

Only the finest of materials are used in these sleeves, and they are made by precision methods that assure freedom from burrs and other defects. Write for Bulletin 20 describing the line, or let us send you free samples.

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BATTLE CREEK, MICH.

Small Operator Fights REA Invasion

I. R. Nightingale, operator of a small light and power plant at Norwood, Colo., has filed a request for a "cease and desist order" with the Public Utilities Commission to restrain the REA from entering his territory. This is the first attempt of a Colorado utility company to prohibit invasion of its territory by the Federally subsidized rural electrification administration, by filing a complaint with the state public utilities commission.

The PUC chairman, Edward E. Wheeler, said that he has obtained an opinion from the attorney general holding that the REA is not a public utility inasmuch as its activities are confined to its own membership and not a service for the general public. He also expressed belief that action may pave the way for a court test of the utility question.

Nightingale contends the REA has no certificate to operate a public utility and that the proposed rural electrification is illegal. He also states that he is able to take care of the electrical needs of the farmers in the vicinity of Norwood, the San Miguel Valley. Attorneys interested in the question say the REA enterprises throughout the state will be sharply curtailed should the Norwood case be upheld in favor of Nightingale.

Another complaint interesting to REA and the utility companies is still pending. In that, the Mountain Utilities Co. demands the City of Colorado Springs be denied the right to sell electric energy at wholesale prices in any area the Pikes Peak Rural Electrification Assn. is authorized to serve. The complaint also asked an order to permit the Mountain Utilities to sell the REA project electric energy at the same prices that might be offered by the Colo. Springs Co.

Parker Dam Hydro Plant Construction Goes Forward

Just below the California abutment of Parker Dam on the Colorado River, construction forces of the Federal Bureau of Reclamation are pushing forward the building of a hydroelectric power plant that ultimately will generate 135,000 h.p. of energy from the waters stored in Lake Havasu, the huge reservoir formed by the dam, according to F. E. Weymouth, general manager and chief engineer of The Metropolitan Water District of southern California.

Officials of the Metropolitan Water District state that work is now being rushed on the new power plant in order to make electric power available for Phoenix, and the agricultural territory in the Salt River Valley and the Gila River project. To meet a serious power shortage in the Arizona territory, it was stated, Boulder Dam power is now being sold to consumers in this area and is being delivered via the Metropolitan Water District transmission line as far as Parker Dam, and from that point over a recently completed power line into the Phoenix district. This Boulder Dam power, it was explained, is a portion of the block of energy assigned but not now required by the Water District of Southern California. A portion of the revenues derived from these power sales is credited to the Metropolitan Water District.

It is expected that the plant will be ready to place in operation in the summer of 1941. Forces engaged in the construction of the power plant are employed directly by the Government and not by the Metropolitan Water District, it was explained.

Spokane City Franchise Held Invalid by Supreme Court

The Spokane city franchise sought by the Washington Water Power Co. was declared invalid by the Supreme Court of the State of Washington on April 26, bringing to a close a legal battle of nearly a year.

In a unanimous decision, the court held that the franchise was invalid because it contained two separate grants, one of which was subject to referendum by the people and the other the sole power of the mayor and city council.

The franchise was granted a year ago by the city council to the Spokane Central Heating Co., since absorbed by the power company, and provided for the service of steam heat, hot water, and electricity. Under the laws of Washington, all franchises except those for electric service are subject to referendum, while those for electric service are within the power of the mayor and council. The supreme court ruling was that the two types of franchise could not be combined. It upheld the contention of the company that the franchise for electric service could not be subject to referendum.

The franchise of the power company in Okanogan county was protected by a decision in superior court, when Judge Timothy A. Paul denied a writ of necessity to condemn the property of the company within the county on the same day. Judge Paul ruled that Okanogan County PUD No. 1, who asked the writ, needed no franchise to do business in the county and hence could not condemn the franchise of the power company. He also held that the PUD could not force persons living outside the county to take its service.

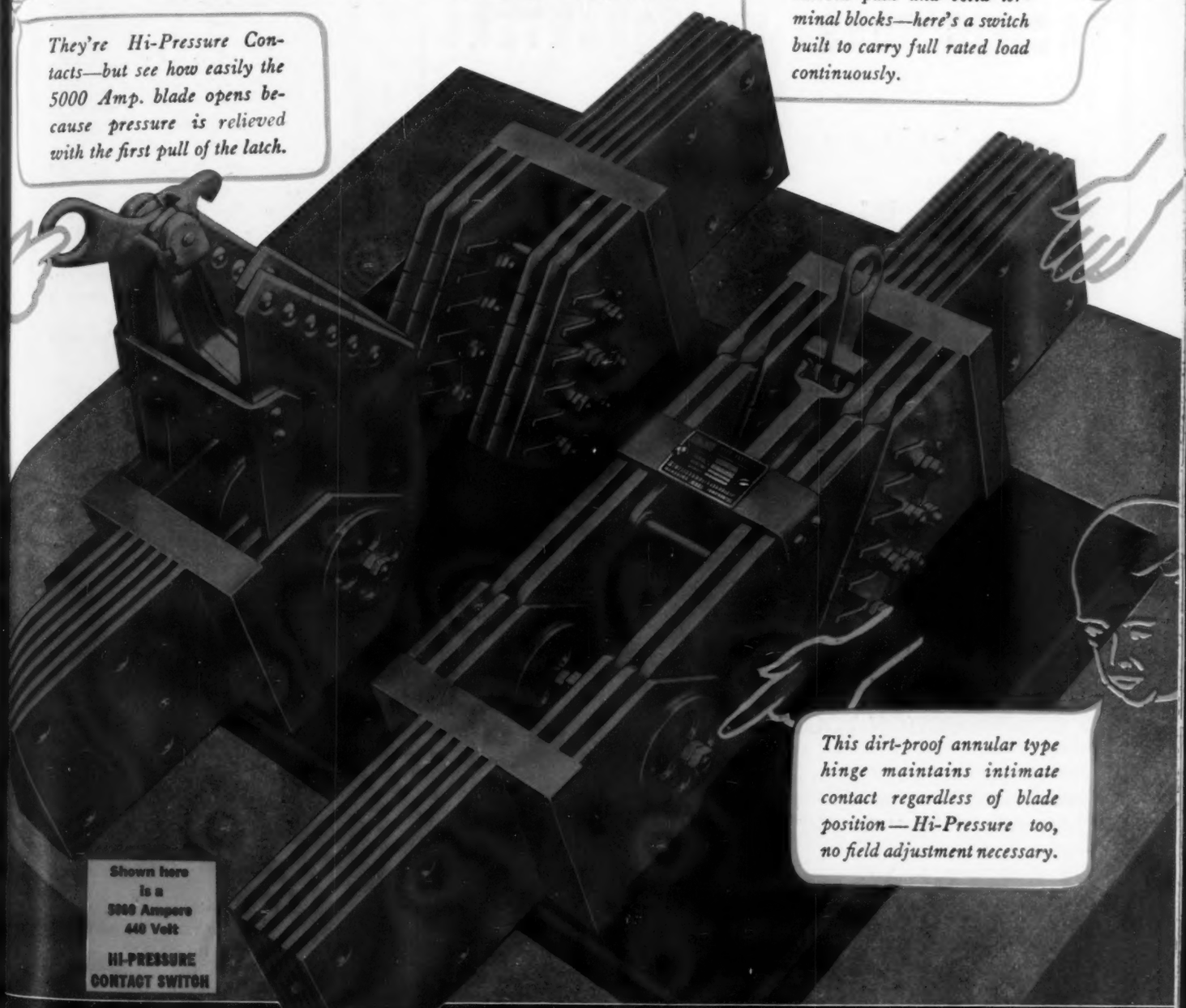
R&IE *Craftsmanship*

Craftsmanship, in the individual creation of things throughout the centuries, reflected diligence, genius and love of doing things well. The workman's each and every production became a portion of his very life and soul . . . . .

Craftsmanship, in mass production as shown in R. & I. E. switching equipment today, reflects the same diligence, genius and love of doing things well. One or one-hundred R. & I. E. switches are equally superior in design, workmanship and long day-in and day-out service.

They're Hi-Pressure Contacts—but see how easily the 5000 Amp. blade opens because pressure is relieved with the first pull of the latch.

And note the straight-line current path and solid terminal blocks—here's a switch built to carry full rated load continuously.



This dirt-proof annular type hinge maintains intimate contact regardless of blade position—Hi-Pressure too, no field adjustment necessary.

Shown here is a 5000 Ampere 440 Volt HI-PRESSURE CONTACT SWITCH

HI-PRESSURE CONTACT *INDOOR* SWITCHES

RAILWAY & INDUSTRIAL ENGINEERING CO., Greensburg, Pa. IN CANADA — EASTERN POWER DEVICES, LTD., TORONTO

Tillamook County Signs Bonneville Contract

Tillamook County (Ore.) people's utility district signed a contract last month for the purchase of a minimum of 2,000 kw. of prime power from the Bonneville Power Administration. It was Bonneville's first contract with an Oregon district. Four contracts have been executed with PUDs in the state of Washington.

The new agreement covers a 20-year period. Initial delivery will be upon completion of Bonneville's Tillamook transmission line, now under survey, and upon acquisition by the district of a power distribution system. Tillamook is negotiating for the purchase of the electric generating and distribution properties of the Mountain States Power Co. which now serves the area.

Payment for power by the district will be at the rate of $17.50 per kw-yr. Because Tillamook's contemplated purchase of the Mountain States system will include a steam generating plant, which can be used for standby and peaking purposes, the district also will be eligible to receive Bonneville dump energy, when needed and available, at ¼c per kw.-hr. Provision also is made for the interchange of surplus power by both systems.

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VICTOR PORCELAIN INSULATORS
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Wash. Water Power Declares Rate Reductions

Substantial reductions in the residential, farm and commercial electric service rates of the Washington Water Power Co. were declared late in April through the public service commissions of Idaho and Washington. The reduction means a saving of $300,000 per year, and is the second rate cut within the period of one year in the WWP territory.

The reduction comes as a result of several factors, according to J. E. E. Royer, vice-president and general manager of the utility. First is the increased use of electric service, which has shown a steady gain by customers throughout the territory. The company's policy of decreasing costs as the use of service increased has accounted to considerable extent for the fact that the average consumption for residential customers stands at 2,060 kw.-hr. per year, while in the commercial field the acceptance of electric service is indicated by licensed restaurants with 24 per cent electrification; commercial bakeries with 49 per cent electrification; and "institutions" have all-electric service to the extent of 51 per cent. It is interesting to note that the average cost for service to the residential customer was approximately 2.17 per kw.hr. before the present rate cut.

The sharpest reduction in the new rate is in the top bracket, as the following comparison shows:

Previous Rate Schedule in Spokane

SCHEDULE 1		SCHEDULE 2	
70c	first 14 kw.-hr.	70c	first 14 kw.-hr.
4c	next 45 kw.-hr.	3.9c	next 50 kw.-hr.
3c	next 80 kw.-hr.	2.5c	next 150 kw.-hr.
		0.7c	water htg. after $4.70

New Rate Schedule in Spokane

SCHEDULE 1			
70c	first 14 kw.-hr.	2.5c	next 140 kw.-hr.
3.5c	next 56 kw.-hr.	0.7c	water htg. after $4.68

The feature of the previous rate providing for water heating on a single meter at 7 mills is unchanged. However, the new rate calls for simplification to the extent of eliminating one schedule, previously applied to small towns. The present new rate setup calls for a Spokane, Towns and Rural classification. $194,000 of the $300,000 reduction benefitted residential customers, and this amount, together with the rate cut last June, gives residential users an average reduction of 12 per cent within the year's period.

Inland Empire customers in the past ten year period have not only had rate savings amounting to $1,255,000 per year, but have been further benefitted by an increase in taxes paid by the utility from $1,154,169 in 1930 to an estimated $2,070,000 in 1940.

PUD Information Service Held Legal

In a new ruling by Attorney-General G. W. Hamilon, Olympia, Wash., legality of the PUD Information Service was established recently. The ruling was in response to a letter from the State auditor asking an opinion on the validity of a contract drawn by the public utility districts, setting up the said information service. At the same time, Hamilton ruled that commissioners of public utility districts have a right to meet together as a commissioners' association and take action of a general nature, in order to coordinate their program of acquisition. This reversed a previous opinion issued by Hamilton.

The state auditor's letter pointed out that each district employs the Information Service, but that the several districts are employing the same person, in the interest of economy and efficiency. In reply Hamilton declared:

"First, we wish to say that any service for which one public utility district may contract, any other district may also in like manner contract for the same. The fact that two or more districts join together in contracting for the service would not of itself invalidate the same. So, any service or employment for which a district may pay out public funds may be shared by other districts and, of course, the payment for such service may be prorated among such districts."

Safety Record Set by Long Beach Station

An outstanding safety record at the Long Beach Steam-Electric Station of the Southern California Edison Co. was observed recently when Harry J. Bauer, president, presented a bronze safety plaque to F. G. Philo, superintendent of steam generation. Also present at the ceremony were W. C. Mullendore, executive vice-president of the Edison company; F. B. Lewis, vice-president and general manager, and employees of the company's Long Beach division.

The plaque commemorates nearly five years, or 1,517,890 man-hours, of operation without an accident which resulted in lost time for an employee of the steam plant. The record covers the period from Oct. 10, 1934, to July 1, 1939. An average of 160 men were employed during that time. The time included in the record is equivalent to one man working for eight hours a day, five days a week, with customary holidays excepted, for 748 years.

The accident which terminated the record was a minor injury. No major accident has occurred at the plant in 15 years.

The Edison Steam-Electric Station covers about 40 acres on Terminal Island in Long Beach and is one of the largest generating stations of its kind in the United States. It has a generating capacity of 556,300 hp. installed in three plants.

Hartline Elected President of PUD Commissioners

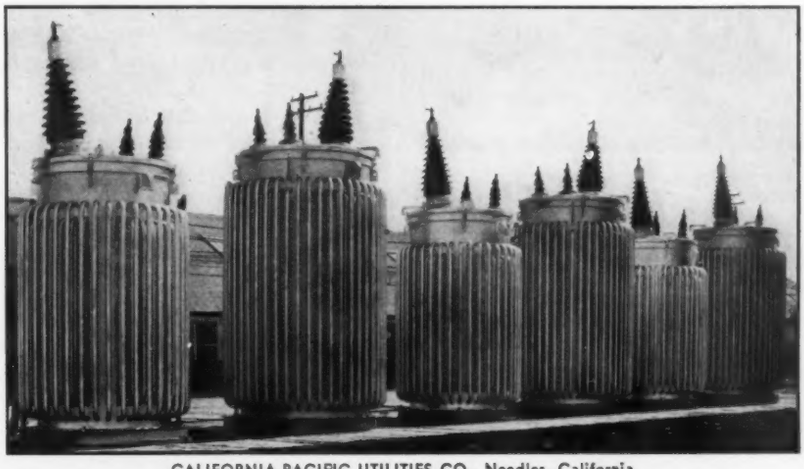
The State Association of Public Utility District Commissioners, at a recent meeting in Seattle, elected Oliver Hartline, Thurston County, president, replacing E. R. Eby, of Pasco, recently deceased. The association voted approval of an over-all corporation plan providing for a non-profit corporation to be organized by Bonneville, City Light and commissioners from the PUD counties for the purpose of acquiring private utility properties and operating them until such time as individual PUD's can take over their local distribution.

The accompanying trust agreement binds the directors to a policy of public ownership without profit, operated exclusively for the public interest it is declared. The program was outlined by James I. Metcalf, New York utility expert employed by the Consumers Non Profit Public Power Corp.

CUSTOM-BUILT To Handle

69,000 Volts

UNDER DIFFICULT OPERATING CONDITIONS!!



CALIFORNIA-PACIFIC UTILITIES CO., Needles, California
3—333 kva., 39,840/69,000 to 6900 Volts —— 3—667 kva., 39,840/69,000 to 2300 Volts

Solve YOUR Voltage Problem with a GARDNER Transformer

When Boulder Dam power first arrived in Needles over a modern 69,000 volt transmission line, Gardner Transformers were put in service. Under unusual operating conditions—high temperatures—dangerous lightning storms—they have given dependable performance.

There's a reason why! Gardner Transformers are Built-to-Order to specifically meet YOUR particular voltage problem and YOUR operating conditions. No wonder you find them in operation all over the West!

Write TODAY for full information.

GARDNER ELECTRIC MANUFACTURING CO.

4227 HOLLIS STREET EMERYVILLE, CALIFORNIA

YOUR NAME MAYDWELL TELLS QUALITY

MAYDWELL & HARTZELL

INCORPORATED

Engineers & Manufacturers' Representatives

SAN FRANCISCO PORTLAND LOS ANGELES PHOENIX

JEFFRIES

TRANSFORMERS

BUILT TO ORDER IN A HURRY!!

When you are installing or re-arranging—and need a special transformer to **exactly** match your requirements—call on us. We can deliver in a week to 10 days.

Specify scattered transformers to eliminate duplicate conduit runs and save on power costs.

JEFFRIES TRANSFORMER COMPANY
5706 Long Beach Ave. Los Angeles, Calif.

THERE ARE "BESTS" IN EVERY INDUSTRY

IN ELECTRICAL APPLIANCES IT'S

Sunbeam

Automatic MIXMASTER
Double Automatic IRONMASTER
SILENT AUTOMATIC TOASTER
Automatic COFFEEMASTER
SHAVEMASTER
FLAT TOASTER • FAN HEATER
GLASS COFFEE MAKERS
WET-PROOF HEATING PAD
MASTER PLUG & CORD SET

MADE AND GUARANTEED BY
CHICAGO FLEXIBLE SHAFT COMPANY
5600 West Roosevelt Road, Chicago, Illinois
316 Commercial Street, Los Angeles, Calif.
224 S. W. Temple Street, Salt Lake City, Utah
557 Market Street, San Francisco, Calif.
50 YEARS MAKING QUALITY PRODUCTS

Washington PUD Balks at Acquisition of Property

Plans for acquisition of the holdings of the Washington Gas & Electric Co. in the Longview-Ryderwood area in Cowlitz County, Wash., on which a condemnation jury recently placed a value of $6,011,566, will be held in abeyance by the public utility district directors of the county. A careful survey of the matter must be completed before action is taken, the directors advise. The latter were intensely disappointed in the valuation, which they had placed at around $3,000,000.

Steps which the PUD may take are set forth as: 1. pay the price set by the Tacoma jury; 2. negotiation with the Washington Gas Company in the hope of getting a price lower than that set by the jury; 3. build a system of duplicating lines and enter competition with the utility.

The Cowlitz County Public Ownership League has urged the PUD directors to refuse payment of the sum set, and to set up its own distribution system instead, but it was agreed that such a move presented many complications, including the difficulty of selling PUD bonds for the purpose of setting up a duplicate system.

PUD officials state it can purchase the company's holdings in the county for $5,900,000, retire bonds drawing 4½ percent interest and still reduce rates by 25 percent. They said they would need assurance, however, from industrial plants that they would continue buying power from the system, rather than setting up their own generating plants. The commissioners will confer with Bonneville project officials, their attorney and with the public before charting a course of action.

Westinghouse and G-E Declare Mazda Price Cuts

Both Westinghouse and General Electric have declared sweeping price reductions on more than 100 types of *Mazda* lamps. Averaging a 17 per cent drop, this reduction became affective June 1.

Of particular interest to users of household types are the 7½, 15, and 25-watt *Mazda* lamps, now listed at 10c each. Lowest price of a home-type Mazda lamp heretofore has been 15c. Other popular household *Mazda* lamps substantially reduced are the standard inside-frosted 40, 50 and 60-watt sizes, each having been reduced from 15c to 13c.

Most of the lamps affected by the price change are general-service types designed for a variety of uses in homes, stores, offices, and factories. Included in the list is a wide range of tungsten filament, fluorescent, and mercury lamp types.

General lighting service types affected by the new price reductions include the following:

	Old Price	*New Price*
25-watt inside frosted	$ .15	$ .10
40-watt inside frosted	.15	.13
50-watt inside frosted	.15	.13
60-watt inside frosted	.15	.13
200-watt clear or I. F.	.30	.27
300-watt clear (Med. Base)	.50	.45
500-watt clear (Mog. Base)	$1.20	$1.10
15-watt T-8	$1.15	$ .95
15-watt T-12	1.45	1.25
20-watt T-12	1.65	1.25
30-watt T-8	1.50	1.25
40-watt T-12	2.30	1.90

New prices for projection and stereopticon service range from 80c for a 100-Watt lamp with E-8 bulb, to $4.50, $4.75 and $6.00 for various 1,000-watt types.

New prices on *Mazda* lamps for spotlight and floodlight service range from 80c for the 100-watt clear spot type, to $5. for 1,000-watt types.

Utah Power Wins Maine Court Suit

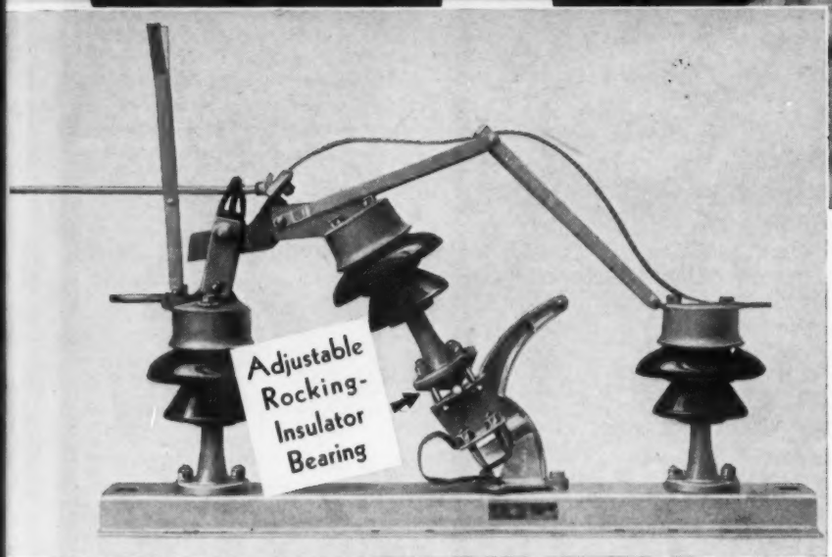
Utah Power & Light Co. has been accorded favorable decision in a Kennebec county, Maine court in a suit brought by a minority group of preferred stockholders against the Utah utility and the Electric Power & Light company, involving cancellation of common stock held by the Electric Power & Light and the common dividends paid on the stock.

The minority group held 310 shares of preferred stock. There are approximately 250,000 shares of preferred stock outstanding. Plaintiffs sought to have returned to Utah Power & Light $7,200,000 in common stock dividends paid to the Electric Power & Light corporation over a period of several years.

The defendants filed demurrers and arguments on Jan. 19, 1939 and on March 21, 1939, the court entered a decree sustaining these demurrers and dismissing the plaintiff's bill in equity. Appeal was taken by the plaintiff and arguments on the appeal were heard Dec. 6, 1939, with the recent decision dismissing the appeal.

● TEMPORARY ORGANIZATION of a statewide Washington Public Ownership League, designed to secure for users the greatest amount of power at lowest possible cost, was realized at Ephrata, Wash., recently. Purpose of the group is to co-ordinate municipally owned and governmental electrical systems to make available more power at cheaper rates. Harry Pierson was elected president and James O'Sullivan temporary secretary.

Now we KNOW which is America's Lowest-Cost Switch Installation



Its Low First Cost, Low Installation Cost, Money-Saving Maintenance and Long-Lasting Reliable Service--- Win Praise from Scores of Utilities.

Type PS-1, PSA-1
Single-, Double-, Triple- and Four-Pole Units
200 amperes; 7,500 to 34,500 volts
for Rural and Distribution Lines

Take these benefits—low first cost, low installation cost, money-saving maintenance and reliable service —and you've got

America's Best Switch Buy

Now consider the *easy-to-adjust* rocking insulators. They assure quick and easy alignment of the group-control shaft which is bolted in place *after* the switch is mounted. You've also got *ease of operation* because the control shaft counterbalances the rocking insulators.

The ordinary switch is not counterbalanced, requires time to thread the control shaft through the bearings. You may get poor adjustments and "sticky" operation which causes outages.

Pacific Electric's sound switch design, with 25 years of reliable use by scores of utilities, assures you of safe reliable service *under all weather conditions.*

Has full current-carrying capacity, high-conductivity copper-alloy terminals and blades, rigid base, AIEE and NEMA Standards and hot double-dip galvanizing.

Why waste money on poorly-designed switches? Get all the Pacific Electric facts—see why this is America's lowest-cost switch installation which wins friends for utilities through long-lasting trouble-free service.

C. H. CUTTER
1006 Securities Bldg.
Seattle, Wash.

G. B. KIRKWOOD
437 S. Hill St.
Los Angeles, Cal.

URBAN HALLIDAY
230 U. S. Nat'l. Bank Bldg.
Denver, Colo.

ELECTRIC STEEL FOUNDRY
H. R. Slocum
P.O. Box 2696, Honolulu, T.H.

Other Representatives in Principal Cities

Send for free Bulletin No. 66

Pacific Electric Mfg. Corporation

5815 Third St., San Francisco — *Representatives in Principal Cities* — **Dunes Highway, Gary, Indiana**

$38,000.00
SAVED THROUGH ROUTINE TRANSFORMER CHECKING

FIND OUT HOW SUCH SAVINGS ARE MADE-
GET THE COMPLETE STORY

★ A large operating company through routine checking with MAX-I-METERS tested 3300 three-phase and open-delta transformers and checked up the connected motor load of 5300 three-phase power customers at an average cost of $2.12 per transformer.

Results: In 90 transformer installations, capacity was removed or reduced by 2060 kva, releasing $18,000 worth of three-phase capacity for use elsewhere on the system. Also, 59 locations were found where the existing transformer capacity was over-loaded or had too much connected load endangering 2000 kva capacity or $20,000 in transformers.

Routine checking with the MAX-I-METER finds out such things for you.

The MAX-I-METER is a modern, lightweight, weatherproof, maximum demand ammeter combined with a multi-range split core current transformer—4 ratios—which clamps over the conductor. No connections to make. No trailing leads. Ready for instant use—no support necessary. Accurate to 3% plus or minus. Not affected by ambient temperature. Can be easily reset and used immediately.

HD ELECTRIC CO.
100 W. Monroe St. Chicago, Ill.
L. A. Nott, San Francisco
H. W. Wittenberg, Los Angeles
T. S. Wood, Seattle

Sierra Pacific Power Valuation Increased

An increase of $1,500,000 in the valuation of the electric department of the Sierra Pacific Power Co. was made by the Neveda Tax Commission last month. The valuations, set by the commission for taxation purposes, were increased for 13 public utilities operating in the state, including five concerns receiving Boulder Dam power.

The Los Angeles Dept. of Water & Power holdings in Nevada, which includes their power lines, were increased $900,000, while the Metropolitan Water District of Southern California was increased $25,000, Southern California Edison Co., $50,000 and the Lincoln County Power district, which has protested against paying any taxes at all, was given a valuation increase of $300,000. The Southern Nevada Power Co., which supplies Las Vegas, was increased $68,000, to a total valuation of $408,000.

Full Day Reduction in Freight Shipments Claimed

A new 24 hour time reduction for L.C.L. freight shipments from the East is proving advantageous to Western electrical distributors, according to Mitchell B. Howe, Pacific Coast manager, National Carloading Corp.

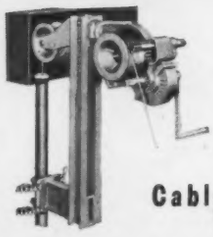
Constant improvements in freight forwarding service, according to Howe, have resulted in increasing use of this medium of transportation by electrical distributors, one large San Francisco distributor reporting that as much as 90% of its L.C.L. shipments from the East are handled by freight forwarders.

In many instances this service is said to have enabled distributors to reduce the size of their inventories. For example one firm has found that the use of forwarding service in one class of appliances cut down inventory stock from 90 to 60 days.

The new time reduction affects all cities in the Western district except Butte and Albuquerque, according to Mitchell Howe. Under the new arrangement L.C.L. shipments will arrive at Coast terminals on the morning of the 6th day from Chicago and the morning of the 9th day from New York.

● ANNUAL REPORT to stockholders of San Diego Consolidated Gas & Electric Co. for 1939 was an unusual piece of literature. Its twenty pages were well illustrated, marking a departure from the typical stockholders' report. The territory served by the company was featured in various attractive outdoor scenes. Charts that depicted other phases of the year's industry were clever visual diagrams in pictorial form.

Greenlee TOOLS Are EASIER And FASTER For The Man on the Job



Cable Puller

The Greenlee Cable Puller shown here eliminates the heavy, cumbersome equipment formerly used for pulling in cable. Now, this Greenlee, which anchors right on to the conduit through which pull is made, will make the toughest pulling job easy.

Conduit Benders

The Greenlee Hydraulic Conduit Bender is a portable, light tool, easily carried to the job and set up, that can be operated easily and quickly by one man, and one that will save you time and money on every job.

Knockout Tools

Greenlee Punches and Cutters will enlarge holes in metal boxes easily and quickly, leaving a clean, smooth hole that requires no reaming or filing. Another example of Greenlee tools that help you save time and money on every job.

Write for Catalog 31E
GREENLEE TOOL CO.
1703 Columbia Ave.
ROCKFORD ILLINOIS

GENERAL ELECTRIC AGAIN

REDUCES PRICES OF MAZDA "F" FLUORESCENT LAMPS

"INDOOR DAYLIGHT" MAKES SEEING FASTER!

In industrial plant offices . . . and business offices too, work goes faster and more efficiently with fluorescent daylight. 48-inch G-E fluorescent daylight lamps provide 50 footcandles in this factory office. Hours of use are increased and all factors—customer, utility, and manufacturer are benefited.

Lower prices will help make dollars go further in installing more light . . . higher footcandles. Fluorescent lamps and new approved fixtures now available at G-E MAZDA lamp distributors

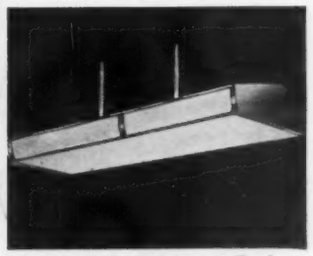
• • •

Complete . . . ready to install!

INSPECTION is made easier and eyestrain lessened by G-E Fluorescent lighting installations such as this one over inspection tables of a tin-plate plant. This better lighting has speeded production and reduced spoilage.

THIS MERCHANDISE ON DISPLAY took on added glamour when lighted with fluorescent daylight. Both color and detail are emphasized. Show customers how fluorescent lighting can build their profits!

LOOK FOR THIS TAG —certifying that fixture meets specifications set up by MAZDA lamp manufacturers. Fleur-O-Liers must be equipped with auxiliaries (ballast and starters) certified by E.T.L.



WIDE CHOICE OF FIXTURES. For best results, G-E MAZDA "F" lamps are recommended for use only with equipment providing good power factor . . . fixtures such as Fleur-O-Liers or RLM industrial units.

NEW REDUCED PRICES

EFFECTIVE JUNE 1, 1940

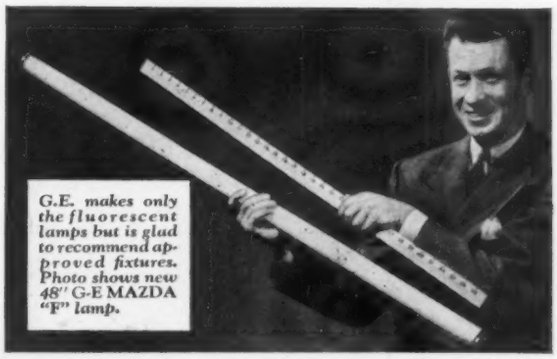
ON MAZDA "F" (*fluorescent*) LAMPS, *daylight and white*

	was	now		was	now
15 watt T-8	$1.15	95¢	20 watt T-12	$1.65	$1.25
15 watt T-12	1.45	$1.25	30 watt T-8	1.50	1.25
			40 watt T-12	$2.30	$1.90

Prices also reduced on blue, green, pink, gold, and red "F" lamps.

NEW LOW PRICES ON OTHER G-E LAMPS FOR BUSINESS

	was	now		was	now
60 watt	15c	13¢	500 watt	$1.20	$1.10
200 watt	30c	27¢	750 watt	3.75	$3.25
300 watt (med. base)	50c	45¢	1000 watt	4.00	$3.50



G.E. makes only the fluorescent lamps but is glad to recommend approved fixtures. Photo shows new 48" G-E MAZDA "F" lamp.

G-E MAZDA F LAMPS

GENERAL ELECTRIC

→ **NOTE:** For best results with fluorescent lighting, General Electric recommends that customers see their local electric service company for lighting suggestions and help, and that they see their G-E MAZDA lamp distributor for fixtures and lamps.

Styles IN LIGHTNING PROTECTION DEVICES MAY Change

BUT THIS [illegible]TAL REMAINS UNCHANGED

—"CONNECT TO DEPENDABLE GROUND RODS"

Lightning arrester performance depends largely upon the ground to which it is connected. Copperweld ground rods have a thick copper exterior permanently molten-welded to a stiff steel core. The copper prevents rust and provides a copper-to-copper contact between ground wire and ground rod. There are no dissimilar metals in contact at the vital point where the ground rod and the ground wire are clamped together—and no electrolytic corrosion. Copperweld clamps with their rugged one-piece body provide simple, dependable connections. Specify non-rusting Copperweld ground rods and clamps to make sure of *dependable* grounds.

COPPERWELD STEEL COMPANY · GLASSPORT, PA.

Pacific Coast Representative: **C. E. INGALLS · Rialto Building · San Francisco, California**

DEPENDABLE · NON-RUSTING

COPPERWELD

GROUND RODS and CLAMPS

Grand Coulee Contracts Ordered by Ickes

Control and switching equipment for the station-service units at the Grand Coulee power plant, Columbia Basin project, Wash., were ordered last month by Secretary of the Interior Harold L. Ickes.

Two contracts were awarded. One to the Cutler-Hammer, Inc., of Milwaukee, of $69,085 for furnishing two generators, two generator control cubicles, and auxiliary-power control equipment. The other to the Allis-Chalmers, also of Milwaukee, for furnishing a metal-clad switchgear, $99,607.

This equipment is for the two 14,000 h.p. station-service units installed in the left power house at Grand Coulee Dam. Although the power plant at Grand Coulee Dam will consist of two separate but similar power houses, one on each side of the dam, only the left power house was included in the existing contract for the construction of the dam to its full height and is being constructed at this time. Equipment for three of the main generating units, which with these two station-service units will comprise the initial installation, is already on order.

Ultimately each house will contain 9 main units of 150,000 h.p. each, giving a total capacity of 2,700,000 h.p., largest in the world both as to size of units and plant capacity. Three of these 14,000 h.p. station-service units will be housed in the left power house.

Utah Power Construction Budget over a Million

Total construction budget for the Utah Power & Light Co. in 1940 will be $1,303,000, major portion of which will be for construction of new rural distribution lines according to George M. Gadsby, president-general manager. The 1940 construction program is expected to add 2,300 new rural customers and includes 140 miles of new lines.

Rural electrification projects planned in Utah are continuous to Tooele, Tremonton, Layton, Henefer, Ogden, Coalville, Kamas, Richmond, Smithfield, Wellsville, American Fork, Carbon county, Salt lake City and Draper. In Idaho the areas are near Hamer, Monteview, Rigby, Ririe, Roberts, Rexburg, Idaho Falls, Shelley, Grace, Thatcher, Lago, Preston, Downey and Swan Lake.

● ANTICIPATING the electrical requirements of the rapidly expanding residential area on Salt Lake City's east bench, Utah Power & Light Co. is constructing a new $65,000 electric distribution center, according to C. A. Wolfrom, Salt Lake City division manager. With the completion of the 5,000 kva. distribution center, an 11,000-volt circuit will feed the area.

● CLARK COUNTY, Wash., public utility district has awarded to R. W. Beck, Inc., Portland engineering and financing company, a contract to appraise properties of privately owned electric utilities in that county. The appraisal of Clark County properties of the Portland General Electric Co., Northwestern Electric Co. and Pacific Power & Light Co. will be the basis of an offer by the PUD to purchase the systems.

● THE ELECTRIC CONTRACTING CO. of Seattle, on a bid of $171,684, received a contract from the Big Bend Electric Cooperative, Ritzville, Wash., for construction of a 268-mile REA distribution system in Adams, Franklin and Whitman Counties.

Contracts Awarded

TO STONE & WEBSTER ENGINEERING CORP. for construction of a 220 kv.-steel tower transmission line from Boulder Dam to Los Angeles for The Southern California Edison Company, Ltd. together with additional transmission lines forming interconnections with other parts of the Edison system, in all approximately 335 mi. of line. The contract also includes a new switching station and additions to present substation equipment.

TO OFSTIE CONSTRUCTION CO., Spring Valley, Wis., for construction of entire power system of The Poudre Valley Electric Assn., Severance, Colo., consisting of 229 mi. of line, $131,268.

TO WESTERN MONTANA ELECTRIC CO., Missoula, for building 117 mi. of line for The Missoula Electric Cooperative, $97,469.

TO ELECTRIC CONTRACTING CO., Seattle, for building 277 mi. of line for The Big Bend Electric Cooperative, Inc., Ritzville, Wash., $172,384.

TO ELECTRIC CONTRACTING CO., Seattle, for construction of entire power system of The Okanogan County Electric Cooperative, Inc., Winthrop, Wash., consisting of 54 mi. of line, $43,845.

TO JARVIS-FIRTH ELECTRIC LTD., Vancouver, contract for the electrical installation in the new Royal Canadian Air Force station, Ucluelet, B. C., $53,873.

TO HUME & RUMBLE LTD., Vancouver, for the electrical installation in the Best Hotel, New Westminster, B. C.

TO HOME ELECTRIC CO., Tacoma, on a bid of $3,800, for furnishing the city with 1,000 globes.

TO THE ELECTRIC SERVICE MOTOR CO., Tacoma, for instrument transformer business for the year, $8,000.

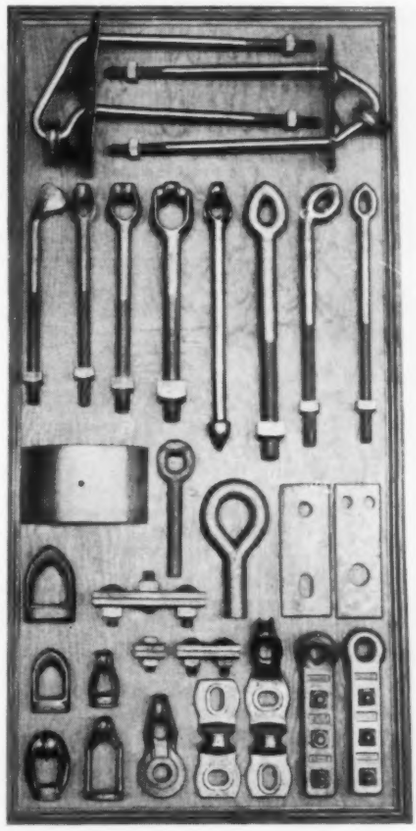
TO LOVE ELECTRIC CO., Tacoma, on bid of $9,062, contract for furnishing 50,000 lb. of copper wire to the city.

TO C. C. MOORE ENGINEERING CO., Seattle, contract for installation of $75,000 power unit at the Aberdeen Wash. plant of the Harbor Plywood Co.

This Tag

Assures Quality

KORTICK-CHANCE*
GUYING
SPECIALTIES
*Manufacture Licensed Under Patents of Albert B. Chance



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COMPLETE WAREHOUSE STOCKS AT PORTLAND, LOS ANGELES, SEATTLE, HONOLULU, T.H.

MALHEUR COOPERATIVE ELECTRIC ASSN., Vale, Ore., has been awarded $30,000 for construction of a generating plant.

JORDAN VALLEY ELECTRIC COOPERATIVE, INC., Jordan Valley, Ore., has been allotted $18,000 to build 4.5 mi. of line in Malheur County, and $12,000 for construction of a generating plant.

DELTA-MONTROSE RURAL POWER LINES ASSN., Delta, Colo., has been awarded $5,000 for wiring.

IDAHO COUNTY LIGHT & POWER COOPERATIVE ASSN., INC., Grangeville, Idaho, has been awarded $1,500 for wiring.

PARK ELECTRIC COOPERATIVE, INC., Livingston, Montana, has been awarded $5,000 for wiring.

BIG BEND ELECTRIC COOPERATIVE, INC., Ritzville, Wash., has been awarded $5,000 for wiring.

RURAL ELECTRIC CO., Pine Bluffs, Wyo., has been awarded $10,000 for irrigation equipment.

ELECTRICAL TESTING LABORATORIES

Electrical Photometrical, Chemical and Mechanical Tests. Inspection of Materials and Apparatus at Manufactory.

2 East End Ave. New York

LINES WANTED

MANUFACTURERS' SELLING AGENTS CONCERN, would like to represent factories in Arizona and New Mexico for electrical lines, household appliances, and other kindred products. We have our own warehouse facilities. Our qualifications are the highest. What have you to offer? ROBERTS-SNOW SALES COMPANY, 113 West Jefferson St., Phoenix, Arizona.

G.C.A.
Lamp Replacers
Lamp Base Removers
Cartridge Fuse Tongs
Switch Hooks
Send for Catalogue
We have been making safety tools for 24 years
THE G. C. A. Manufacturing Co.
Pittsfield, Mass.

TORK CLOCKS

THE POPULAR TIME SWITCH LINE KNOWN EVERYWHERE

NOW—lower prices and higher capacities

There is a Tork Clock for every regular switching job: 60 minute, 4 hour or daily cycles.

Bulletins on request

THE TORK CLOCK CO., Inc.
MOUNT VERNON, N. Y.

Representatives:
A. R. Slimmon, 445 E. 3rd St., Los Angeles
Nicholas & Cook, 1063 Howard St., S. F.
H. M. Sayers, 1019 Eastlake Ave., Seattle
Stevens Sales Co., 41 P. O. Place, Salt Lake City

TRADE NOTES

Henger-Seltzer New Roebling Sales Agent

Henger-Seltzer Co. of Los Angeles has announced a sales arrangement with the John A. Roebling's Sons Co. of California, whereby it will become a sales agent for Roebling electrical products in the southern California and Arizona territory. Complete stocks will be handled in Los Angeles for service through regular jobbing channels.

Roebling products which Henger-Selzer will sell include rubber and cambric insulated, lead covered, parkway, ignition, bare, weatherproof and magnet wires; telephone and special cables and cords; galvanized strand and telegraph wire.

Lloyd Hanlon, for ten years southern California district manager of the Anaconda Wire & Cable Co., has joined the Henger-Selzer organization to direct sales of the Roebling line.

According to E. C. Lowe, president of Roebling of California, the new arrangement will not replace the existing Roebling organization in that territory, but will supplement it.

● LESTER REED AND STANLEY KOPCZYNSKI have recently purchased the Chamberlin Electric of Cottonwood, Idaho. Renamed the City Electric Service, the store will continue to sell General Electric ranges, water heaters, refrigerators and other appliances, as well as maintain a plumbing and electric wiring contracting department.

● ANDREW OLIVER ELECTRIC CO., has been opened in Kamiah, Idaho, by Andrew Oliver, formerly with the Home Furniture Co. of Grangeville. Oliver will feature the complete Westinghouse line of ranges, refrigerators, water heaters and laundry equipment.

● THE ELECTRIC SUPPLY CO., Albuquerque, New Mexico, has been appointed a distributor for G-E vacuum cleaners, electric clocks, electric fans, and heating devices.

● ROBERTS-SNOW SALES CO., manufacturers' agents have opened an office at 113 West Jefferson street, Phoenix, Ariz. E. M. Roberts, Jr., is president, and general manager with Nick E. Snow, vice-president and sales manager.

● L. H. BENNETT has been appointed distributor in northern California of the Automatic Electric Washing Machine Co. Recently he took over the Hammond Aircraft factory near San Francisco and is manufacturing air-conditioning equipment.

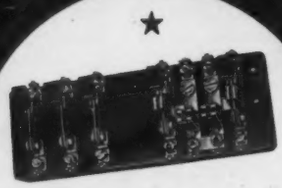
● FRED PORTER—manufacturers agent handling Universal appliances, has moved his display room and warehouse to 1265 Folsom St., San Francisco, from the Western Furniture Mart. New headquarters will have warehouse space.

● MILLER AND KRIVANEK, pioneer Longview, Wash., electrical contracting firm, will now belong to Joe Krivanek, Sr., and his two sons Kenneth and Joe, Jr. Krivanek bought out the interest of Clifford Miller, his partner for more than twelve years. The firm name will be retained.

● MARTIN WOODARD of Marwood Ltd., San Francisco, has announced that Carl H. Hepola, formerly manager of Electrical Products Division of Wolverine Tube Co., Detroit, Mich., is now associated with Marwood Ltd., specializing in sales promotion and wholesaler sales in the San Francisco territory.

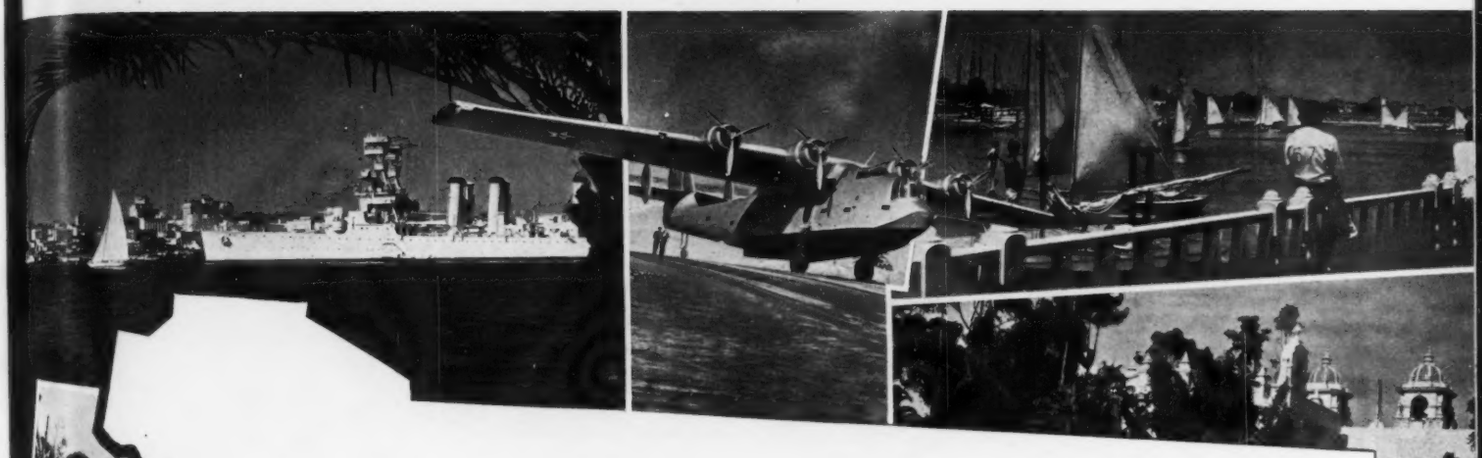
ESTERLINE
RECORDING INSTRUMENTS
EC&M MOTOR CONTROL
LIFTING MAGNETS—WELDTIMERS
LAPP INSULATORS
LINE AND STATION POSTS
STICHT MEGOHMERS
TACHOMETERS—STOPWATCHES
NIAGARA LIQUID METERS
OIL—WATER—ACIDS—LIQUORS
THE T. R. ROUTH CO.
Telephone DElaware 8566
1165 Holloway San Francisco, Calif.

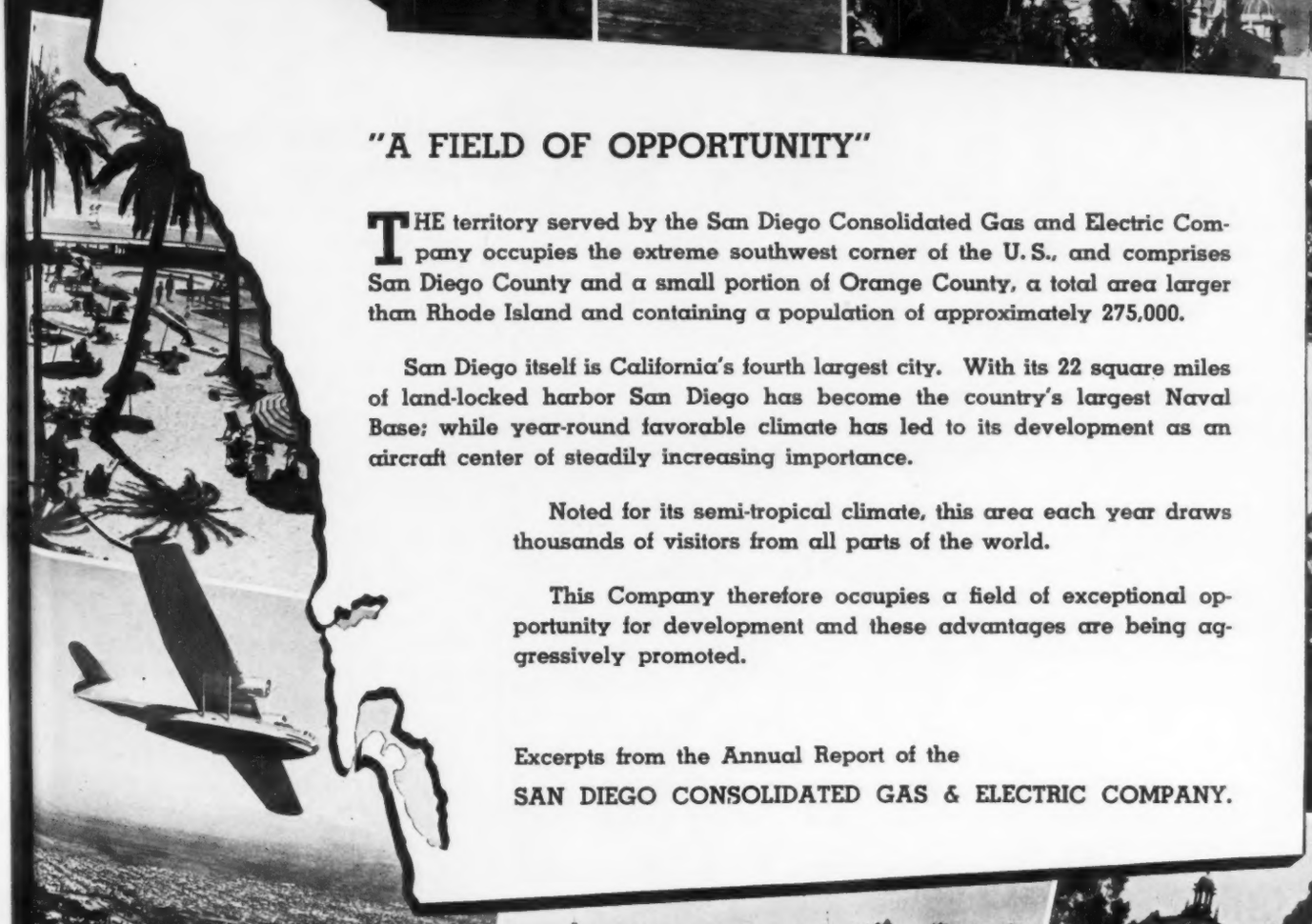
DEPENDABLE



KNIFE TYPE SWITCHES. For meter and relay testing. Front or back connected—any number of poles or arrangement.

METER DEVICES CO.
CANTON, OHIO





"A FIELD OF OPPORTUNITY"

THE territory served by the San Diego Consolidated Gas and Electric Company occupies the extreme southwest corner of the U. S., and comprises San Diego County and a small portion of Orange County, a total area larger than Rhode Island and containing a population of approximately 275,000.

San Diego itself is California's fourth largest city. With its 22 square miles of land-locked harbor San Diego has become the country's largest Naval Base; while year-round favorable climate has led to its development as an aircraft center of steadily increasing importance.

Noted for its semi-tropical climate, this area each year draws thousands of visitors from all parts of the world.

This Company therefore occupies a field of exceptional opportunity for development and these advantages are being aggressively promoted.

Excerpts from the Annual Report of the

SAN DIEGO CONSOLIDATED GAS & ELECTRIC COMPANY.

ABOUT PEOPLE

Sloan Fellowships Go To Western Utility Men

David D. Moffat, Jr., sales manager, Utah Power & Light Co., southern division, has been awarded an Alfred P. Sloan foundation fellowship for a year of research work in economics and industrial administration at the Massachusetts Institute of Technology.

Moffat is one of 11 young executives nominated by industries in all parts of the country who are receiving the fellowships. He will return to his position with the utility upon completion of the research program.

MOFFAT

Walter D. Howell, Pacific Gas and Electric Co., was also named on this select list of Sloan fellowships and will attend M. I. T. during the coming school year. Howell, who late last year was transferred from the East Bay sales department to handle industrial power work in San Francisco, will likewise return to his PG and E position on the termination of this special research.

John S. Walsh, industrial sales manager Bakersfield, San Joaquin Power division, PG and E, succeeds Howell on his year's leave of absence.

Westinghouse Executives Tour the West

A. W. Robertson, chairman of the board, headed a group of Westinghouse officials who visited the San Francisco, Los Angeles, Salt Lake and Denver offices of the company during May. Included in the group were Ralph Kelly, vice-president in charge of sales, Marvin W. Smith, vice-president in charge of engineering, L. W. Lyons, treasurer and Andrew H. Phelps, general manager of purchases and traffic. *(See Profiles)*

Purpose of the visit was to acquaint the officials with business conditions and opportunities in this region. Among the points Robertson emphasized while on the Coast was that the 1939 Westinghouse sales of $24,047,406 in the Pacific Coast district represented approximately 10 per cent of the company's total business in the U. S. He pointed out that the company purchased $6,000,000 of materials in this region in 1939, including $4,500,000 of copper and $300,000 of lumber. Almost $1,000,000 was paid to Western railroads last year, he said. The company has approximately 1,300 employees in the Pacific Coast district and $6,200,000 invested in facilities, raw materials and finished stocks.

Among the things investigated were the possibility of expansion of facilities in the San Francisco Bay region. Visits were made to Mt. Palomar Observatory where Westinghouse equipment is being installed to operate the 200-in. telescope, to Boulder Dam where several Westinghouse generators are in service and to several important industrial operations where the company is supplying apparatus.

● FORREST YOUNG of the Lapp Insulator Co., LeRoy, N. Y., visited Pacific Coast representatives of the company during May.

● CHARLES C. BINTZ, president and treasurer of the W. H. Bintz Co., intermountain distributors for Frigidaire, has been elected president of the Salt Lake City Community Chest.

★ *For Quick Service on Quality Products from Local Stocks*

Get in Touch with: **GEO. E. HONN CO.**
420 MARKET ST. SAN FRANCISCO, CAL.

MANUFACTURER'S REPRESENTATIVE FOR:

PYREX INSULATORS, POWER AND RADIO — Corning Glass Works
FUSES, RESISTORS, MOUNTINGS, CUTOUTS, FUSE LINKS, DISCONNECTS, BUS SUPPORTS — Schweitzer & Conrad, Inc.
CAPACITORS — Cornell-Dubilier Corp.
CURRENT TRANSFORMERS, NIAGARA AIR INSULATED — Lee Shipwith Company
CABLE GRIPS — Kellems Products, Inc.
CONNECTORS, GROUND ROD CLAMPS, UTILITY HOIST — Jasper Blackburn Products Corp.
GUY WIRE PROTECTORS, CONE ANCHORS, EARTH AUGERS — The Specialty Device Co.
GROUND LINE POLE AND GREEN WOOD TREATMENT — Osmose Wood Preserving Company
TONG TEST AMMETERS—LOW VOLTAGE GENERATORS — Columbia Electric Mfg. Co.
UNDERGROUND CABLE TOOLS & EQUIPMENT — T. J. Cope, Inc.
TREE TRIMMING EQUIPMENT TREE SURGEONS' TOOLS — Bartlett Manufacturing Co.
FRICTION AND RUBBER TAPES — Clifton Manufacturing Co.
METER JEWELS — Herman D. Steel Company

Stocks at San Francisco
Electrical Specialty Co., Inc.,
316 Eleventh Street

Stocks at Los Angeles
Electrical Specialty Co. of So. Calif.,
451 South San Pedro Street

Stocks at Seattle
Electrical Specialty Co., Inc.,
714 Fourth Avenue

For the Coast Trade

At your doorstep you now have an adequate stock of popular D-H alloys, wires, ribbons, rods and other forms.

Driver-Harris Company
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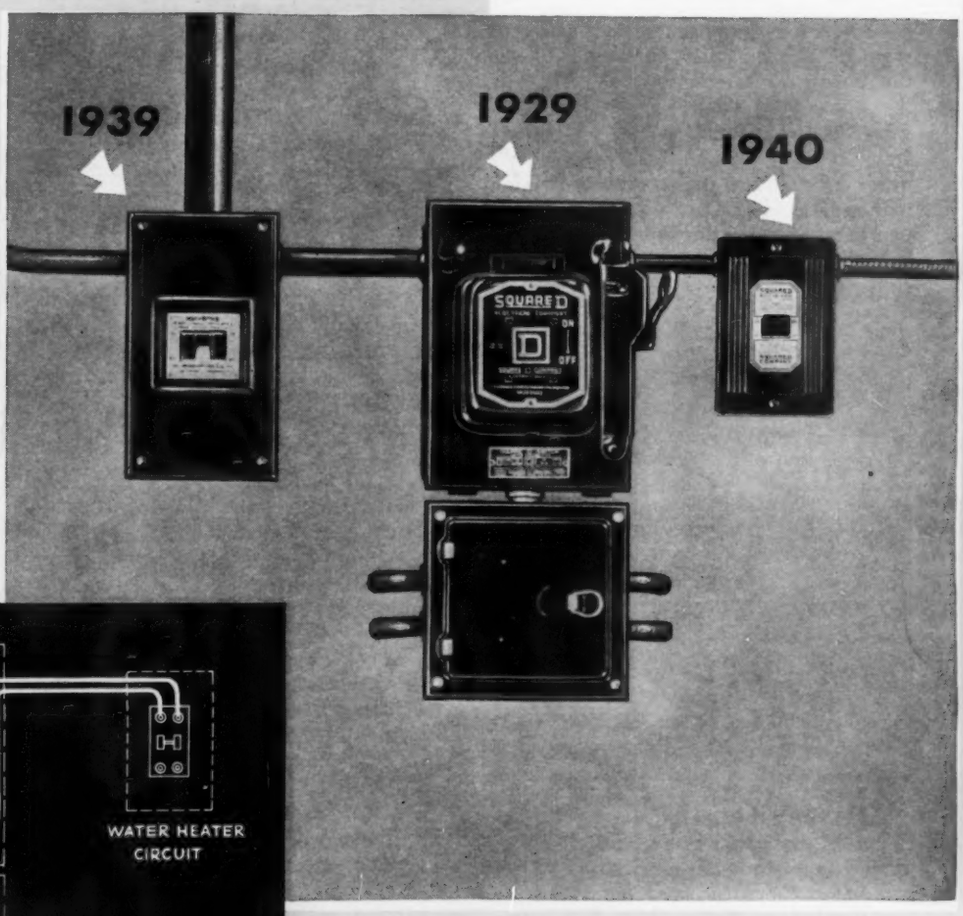
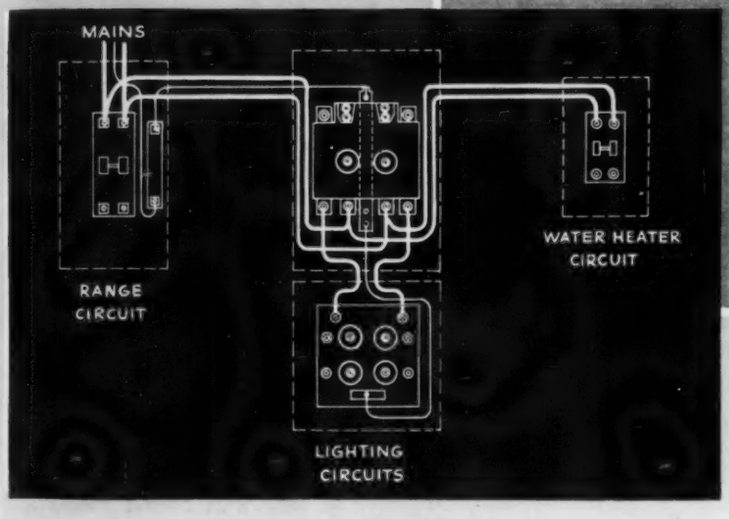
SEE HOW EASY IT IS TO ADD A WATER HEATER CIRCUIT

with the

TYPE MO
MULTI-BREAKER





LISTS AT ONLY $2.40
affords lower installation cost

To show just how easy it is to add a water heater circuit, we have illustrated a typical example.

In 1929, a switch and fuse box was installed. The service entrance switch did not have sufficient capacity for the addition of an electric range, so—

In 1939, when a range was installed, the extra circuit was provided by using a Square D Type M Multi-breakeR. This was done, easily and at small wiring expense.

In 1940, when a water heater circuit is needed, it can be provided, with the same ease and at even less expense, by using the new Square D Type MO Multi-breakeR. The diagram shows just how little wiring is involved.

Because it affords modern protection and convenience—because it is attractively priced—because it involves so little installation expense—the new Type MO Multi-breakeR will prove a valuable asset in getting more water heater installation business.

SQUARE D COMPANY
LOS ANGELES - MILWAUKEE - DETROIT
IN CANADA: SQUARE D COMPANY CANADA LIMITED, TORONTO, ONTARIO

CALL IN A SQUARE D MAN

Tracy New Assistant Manager of Sierra Pacific

F. A. Tracy has been named assistant manager of the Sierra Pacific Power Co., according to company officials. For the past three years, Tracy has been with Stone & Webster Service Corp., New York as personnel director. After graduation from the Univ. of Maine with a B.S. degree in Electrical Engineering in 1919, he went with Stone & Webster in Boston in the company's statistics department.

Following this, Tracy went to the Ponce Electric Co., Ponce, Puerto Rico, as assistant supt. of distribution. After two years there, he was employed by the Blackstone Valley Gas & Electric in Pawtuckett, R. I. where he spent 12 years in various capacities, asst. chief engineer in engineering dept. and later asst. to the president.

● LOU HRUBY has joined the Los Angeles office of the General Electric Lamp Dept. as salesman. He formerly was associated with the sales promotion department of the company's lamp department at Nela Park as traveling representative of G.-E.'s radio program, "Hour of Charm."

● ALSTON RODGERS, division engineer for the General Electric Lamp Dept., Los Angeles, attended the division engineers' meeting of the G.-E. Lamp Dept. at Nela Park in May.

● B. C. J. WHEATLAKE, district manager for General Electric in Salt Lake City, has been elected president of the Salt Lake City Optimist Club.

● P. W. PRICE, vice-president and general manager of the Victor Insulator Co., Victor, N. Y. flew to San Francisco to attend the PCEA convention. After conferring with the company's Pacific Coast agents, Maydwell & Hartzell. Inc., he returned to the East via Los Angeles.

● D. H. CAPELLI, with Graybar Electric Co. San Francisco and Oakland offices for the past six years, has been appointed merchandise manager for the company's Salt Lake City office, according to Roy Kimberlin, Salt Lake City branch manager. Capelli was associated with H. R. Curtis Co., Oakland, prior to joining Graybar. Capelli replaces Vern Brown who has been promoted to the position of Appliance Sales Manager of the company's branch at Butte, Montana.

● JAMES R. KEARNEY, SR., chairman of the board of J. R. Kearney Corp., St. Louis, Mo., accompanied by George C. Foster of the same organization, came to the Coast in May to attend the PCEA convention.

● J. F. MCALLISTER, manager of residential sales for the Utah Power & Light company recently addressed salesmen of the Utah State Realty Assn.. "Close Attention to Details Necessary in Successful Selling."

● WALTER F. PRICE for some years in San Francisco and more recently of the Associated Wholesale Electric Co. in Los Angeles has joined the Tri-State Supply Corp., of Los Angeles.

● GEORGE H. WISTING, assistant general manager, Northwestern Electric Co., was named recently to head Portland's Community Chest campaign to be carried on in the fall. He was vice-chairman of last year's compaign.

● GEORGE A. HUGHES, well known pioneer electric range manufacturer, has been advanced to chairman of the board of the Edison General Electric Appliance Co. A. D. Byler, former vice-president and general manager, succeeds Hughes as president, and Ray W. Turnbull, vice-president in charges of sales, becomes first vice-president of the Hotpoint organization.

● L. W. UNDERWOOD, credit manager, Ogden division, Utah Power & Light Co., was recently elected a vice-president of the National Credit Men's Assn.

● M. D. BROOKS has been appointed district merchandising manager of the Northern Electric Co., Vancouver, B. C., according to T. C. Clarke, district manager of the company in British Columbia. Brooks has served with the company for the past six years as merchandising specialist and illumination engineer in Alberta and British Columbia. He is also a member of the Home Appliance Council of the Electrical Service League of British Columbia and has served for several terms in various offices of the Vancouver Electric Club.

● LORIN A. MOORE, Seattle, has been named commercial and industrial representative in Bremerton, Wash., for the Puget Sound Power & Light Co., replacing A. B. Couch. Moore has been with the company for 10 years in field work.

● AL C. JOY, director of advertising, PG and E, was recently elected president of the San Francisco Advertising Club.

Deaths

Frank M. Kerr, 71, honorary president of The Montana Power Co., and dean of electrical engineering in Montana, a distinguished citizen of Butte and the State of Montana, died May 17, in Rochester, Minn. where he had gone for a physical checkup.

Only last January, Kerr had celebrated 50 years in the electrical power business. On that occasion his retirement as president of Montana Power was announced. He was the company's first general superintendent, later becoming general manager in 1915. In 1916, he was elected vice-president and at the death of John D. Ryan, he was elevated to the presidency.

● SHIRLEY A. BALDERSON, 60, for 28 years city electrician of Phoenix, Ariz., died in a hospital there, recently, following a heart attack. Well known in the community, he was a native of Prescott, Ariz., and a member of the Arizona Pioneers Assn., the ASCE and other organizations.

● THOMAS F. RYAN, 69, retired construction engineer for Stone & Webster, died in Seattle recently. Mr. Ryan was engineer on the Puget Sound Power & Light Co. plant at Georgetown, and had supervised construction of many large buildings in the Northwest.

● WILLIAM H. (HARRY) DAVIS, 64, well-known electrician of Ogden, Utah, and southern Idaho, died at his family home recently. Davis was foreman when one of the first power lines was built in southern Idaho and northern Utah. For a number of years he was chief operator of the Mapleton, Idaho, power plant and later was connected with the Stanley Stevens Electrical Supply house in Ogden and Logan.

● GENERAL OTTO H. FALK, 74, chairman of the board, Allis-Chalmers Mfg. Co., died May 21 in Milwaukee. After devoting 30 years of his life to the military, Gen. Falk turned to industry reorganizing the old Allis-Chalmers Co. into the present day Allis-Chalmers Mfg. Co. He was made president of the company in 1913.

GENERAL ELECTRIC SUPPLY

SERVES THE WEST !

General Electric Supply Corp. has helped build the West by investing in buildings, warehouses and manpower to serve the needs of the industry. It is an integral part of the industry and its organization has contributed to the expansion and growth of the communities it serves—not alone by contributions to and support of civic development—but by individual work of its employees in community activities of all types.

Offices and Warehouses Where Stocks Are Carried in These Western Cities:

SEATTLE	SACRAMENTO	PHOENIX
SPOKANE	FRESNO	SALT LAKE CITY
PORTLAND	LOS ANGELES	DENVER
SAN FRANCISCO	SAN DIEGO	BUTTE
OAKLAND	EL PASO	BILLINGS

Our complete displays of new and improved products are located at all branches. You'll find it easy to make the selection you desire.

Start NOW to profit from General Electric Supply service. Phone or drop in at your nearest branch TODAY.

GENERAL ELECTRIC SUPPLY CORPORATION

SEATTLE — SPOKANE — PORTLAND — SAN FRANCISCO — OAKLAND — SACRAMENTO — FRESNO — LOS ANGELES — SAN DIEGO — EL PASO
PHOENIX — SALT LAKE CITY — DENVER — BUTTE — BILLINGS

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PROFILES OF THE MONTH

Harry Stevenson (left), power station operator of Utah Power & Light Co. in Salt Lake, receives a forty-year service pin from George M. Gadsby, president at a company banquet

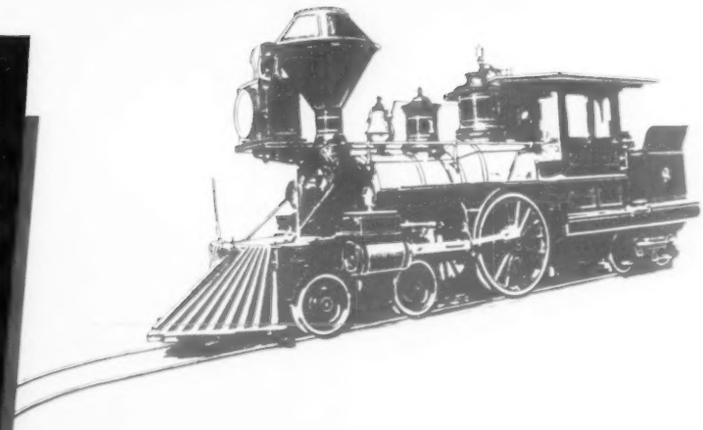
Nationwide honor in his profession has been accorded to A. F. Dickerson, General Electric engineer, who designed Treasure Island's illumination which won him the Charles Coffin award

W. E. Derbyshire, is now assistant merchandising manager for Hotpoint in San Francisco and also manages Hotpoint's table appliance dept.

Wm. Schack, vice-president, Newbery Electric Corp., is president of the Los Angeles Electrical Estimators. John Strickley (seated) is secretary

Travelling Westinghouse executives (see p. 196) grouped here are (standing) L. W. Lyons, treasurer; A. A. Phelps, general mgr. purchases and traffic; Chas. Dostal, Pacific Coast district mgr. Seated are Ralph Kelley, vice-president in charge of sales; A. W. Robertson, chairman of board

Pole Line Hardware HAS CHANGED TOO!



Photo—Southern Pacific

It is a far cry from the "C. P. Huntington" of 1863 to the 1940 "City of San Francisco" with its quiet swiftness, modern conveniences, restful comfortable appointments.

To meet MODERN needs, the design and construction of pole line hardware has changed greatly, too. Through years of experience and painstaking research, HUBBARD engineers have built up an unequalled line of pole line products. Produced by the most up-to-date production facilities and latest methods, HUBBARD products are INDIVIDUALLY DESIGNED for the particular job to be done.

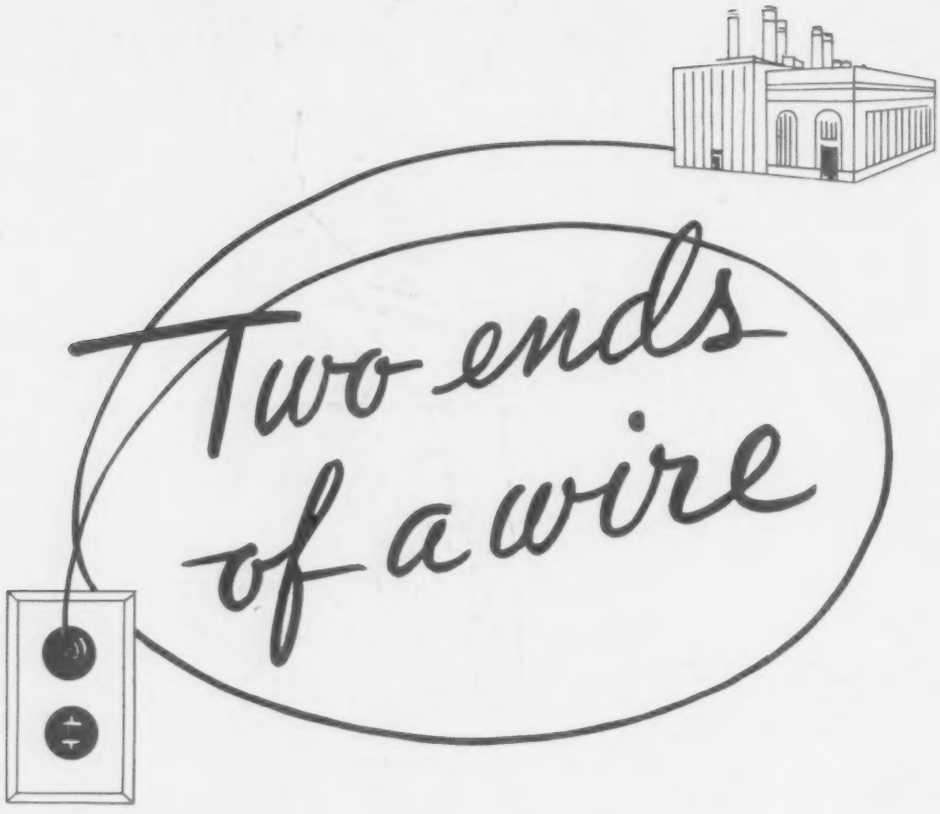
Are YOU using "old style" hardware, originally made to handle some other type of work? It will pay you to investigate our complete line of products, which meet PRESENT DAY conditions. The HUBBARD name on pole line hardware is your assurance of lowest pole line operating costs.

HUBBARD hardware for the Pacific Coast territory is manufactured in our modern plant in Oakland, California, and is distributed through the General Electric Supply Corporation and the Graybar Electric Company. Investigate TODAY!

Hubbard and COMPANY

OAKLAND, CAL. PITTSBURGH CHICAGO

"HANG THE LOAD ON HUBBARD HARDWARE"



Power at the point of generation is profitless. It must be used in an appliance before it is profitable to anyone. Wiring and outlets are deficient in perhaps 99% of the homes standing today—an annoyance to the householder, and a definite sales barrier to the manufacturer, dealer and utility.

The Ancient Mariner moaned "Water, water, everywhere, and not a drop to drink." Today's householder, surrounded by a sea of tricky electrical appliances, moans too. Because there is no place to attach an electric razor in his home, he has to hack away with an old-fashioned one. His wife wants a new electric roaster, but can't buy it because there is no place to attach it.

If manufacturers, dealers, utilities, saw a tabulation of sales lost every year because of inadequate wiring in homes, they would start doing something about adequate wiring promotion.

No matter how much power is generated at the power house, these ample power supplies are unavailable to householders until homes are adequately wired. There must be TWO ends to the wire delivering power if it is to be of any profit to anyone.

No man in the electrical industry can smugly sit back and say "Wiring is not my job." Promoting adequate wiring IS your job whether you are a clerk in the utility, a salesman in the dealer's store, or president of the manufacturing company.

PACIFIC COAST *Electrical* BUREAU

447 SUTTER STREET, SAN FRANCISCO • 601 WEST 5TH STREET, LOS ANGELES